February, 1921

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Vol. XXIV No. 2
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The American City

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Of this vast sum, approximately $550,000,000 will probably be expended in 1921. Municipal, county and state highway departments, as well as contractors, are better fitted to accomplish results this year because of the availability of labor and the increasing use of motor trucks, tractors, trailers and power-driven road machinery

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VOLUME XXIV
NUMBER 2

The American City

NEW YORK
FEBURARY,
1921

The Motor Vehicle Highway Creed

By D. C. Fenner

Systems of Highways

I BELIEVE in

A Federal Highway System;

A state highway system in every state connected with the Federal Highway System.

Establishment of Highways

I believe that

Federal highways should be constructed, maintained, paid for and controlled by the Federal Government;

State highways should be constructed, maintained, paid for and controlled by state governments;

County highways should be constructed, maintained, paid for and controlled by county governments in conjunction with and under the supervision of state governments.

Selection of Routes for Highways

I believe that

Routes for the highways of these systems should be selected with the sole view of meeting the highway transportation needs of the nation, its states and their counties.

Structural Standards for Highways

I believe that

Federal, state and county highways should be free from grades of more than 5 per cent; should be free from sharp turns; should be laid along the shortest route between centers of distribution and not through the main streets of all the towns along the route; and should be free from crossings at grade with railways or other highways. A modern hard-surface highway should be wide enough to provide for two streams of vehicular traffic 96 inches wide. This means a road paved to a width of at least 20 feet, and the total width between inside edges of ditches should be not less than 30 feet. At points of congestion shoulders of proper width should be provided. Highway bridges should be of 20 tons capacity with a clear width of roadway of not less than 24 feet.

Bridge and highway structures should be strong enough to support wheel loads of 11,200 pounds distributed not more than 800 pounds per inch of tire width, said width in the case of rubber tires to be measured between the flanges of the rim, and axle loads of 22,400 pounds with a minimum distance of 4 feet between axles.

They should further be able to support vehicular units of a maximum weight of 28,000 pounds and durable enough to provide throughout their entire length and breadth smooth and economical transportation at all seasons of the year.

The highway surface must be of such a nature that it is weather-proof and dependable under severe usage. It must be wear-resistant, so that extensive or frequent repairs are not necessary, and quick to repair without interruption of traffic and with simple tools and materials; low in tractive resistance; offering a good foothold for horses and rubber tires and yet smooth enough for good speed.

This country needs roads; it cannot prosper without them. But it cannot have them as long as its highway officials continue the practice of laying road-surfacing materials on an unprepared foundation and calling the result—a road. Roads which will resist the attack of the elements will stand the heaviest traffic without injury; roads which will not resist the elements are the cause of our

present great concern over an unfortunate waste of money.

It is no longer possible to adopt one specification for the entire length of a road. Each foot of subgrade conditions must be analyzed, the subsoil must be properly drained so that water may be kept off, out of, and away from, the road and its foundations. A proper foundation to meet the conditions at any particular point can then be laid. Give a wise builder a contract for a building from Philadelphia to New York; tell him that there must be no breaks, that the whole structure must settle uniformly and evenly throughout its length. Will his foundations all be alike? The building of permanent roads is certainly a foundation proposition with proper attention to drainage and to subsoil conditions.

Maintenance Requirements for Highways

I believe that

Federal, state and county highways should be constantly maintained in conformity with the minimum structural standards prescribed for them and that in winter-time main-line highways should also be kept reasonably free from snow and ice for motor vehicle traffic.

Financing of Highways

I believe that

The construction of Federal, state and county highways and their establishment as connected and coördinated systems will bring into being improvements of infinite value to every man, woman, and child in every walk of life, and should therefore be a general charge against all citizens.

The maintenance and administration of Federal, state and county highways should be placed upon the users thereof in proportion to that use.

Highway construction charges should be financed on the pay-as-you-go policy, if possible; otherwise, by bonds to be retired within the life of the improvements.

Highway maintenance and administration charges should be financed on a cash basis from current assets.

Administration of Highways

I believe that

The administration of Federal, state and county highways should be vested in officials of the highest integrity and ability; should be absolutely divorced from politics and political considerations and have unrestricted freedom to function in the best interests of the public as a whole and that portion of it which owns and operates motor vehicles.

Oil on the Troubled Sands

Shifting sand dunes which cover up a highway soon after it is completed have formed a serious obstacle to improved road building in some parts of the country, particularly in the Northwest. To remedy the evil, the Bureau of Public Roads of the United States Department of Agriculture has employed a more extensive application of the agency that has been used in the past to lay dust on ordinary highways—oil.

Fifty-three miles of construction of the Columbia River Highway from The Dalles eastward lies through sandy country, in many places of a volcanic ash as light as flour. As fast as cuts are opened up and fills made in this light soil the wind whips out the fill slopes, and sand dunes creep into rock cuts, completely blocking the road. Oil is the only agency yet found to stop the trouble. The equipment used to spray the crude oil consists of two supply tanks, or drums, in which the oil is carried from the storage tank at the railway siding, and a tractor, which draws the oiling rig and supplies the steam through a hose to the compressor tank, which is carried on a trailer. The oil is heated by the steam and forced through a hose with a nozzle consisting of a half-inch pipe. The steam atomizes the oil and sends it in a fine spray for 100 feet or more, depending on whether the spray is projected in the direction of the wind or against it. For obvious reasons, spraying is usually carried on in the direction of the wind.

Where sufficient oil is used, this means of controling the sand dunes is very effective, and it is believed that the cost will not be excessive, though exact figures are not obtainable at this time.

Central Mixing Plant in County Road Work

By K. C. Wright
Resident Engineer, State Road Commission, Brigham City, Utah

THE contract to construct nine miles of state road from Brigham City to the Utah Hot Springs, both in Box Elder County, Utah, was awarded in May, 1919, to the Phelps Construction Company by the Utah State Road Commission. This piece of road skirts the western slope of the Wasatch Mountains and is part of the state highway, extending north from Salt Lake City to Idaho and other sections. It is, in fact, the only highway through the southern end of Box Elder County leading from central Utah to the state on the north. The Wasatch Range descends rapidly on its western slopes to the shores of Great Salt Lake. The change from the rocky foothills to the swamps adjoining the lake is made at some places in a very few hundred feet, leaving only room enough for one highway.

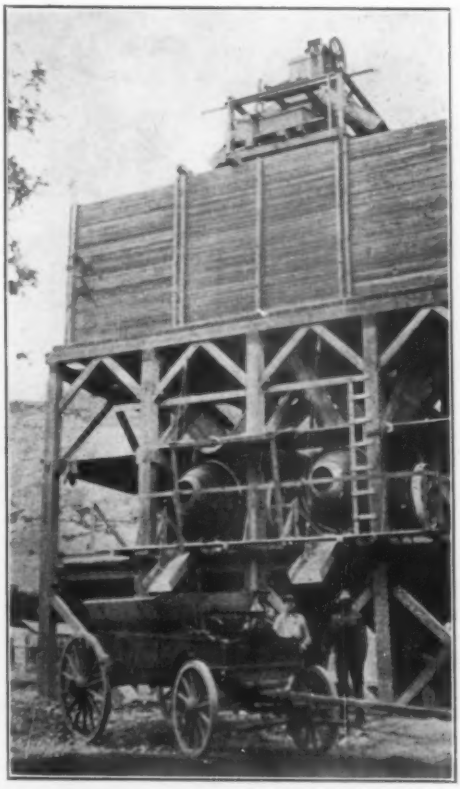
The traffic over this road is, by reason of its peculiar location, very heavy. Plain concrete 6 and 8 inches thick and 18 feet wide was chosen as the type of hard surface best adapted to meet the conditions.

The contracting company started actual paving work in August, 1919, and almost immediately encountered labor troubles. Silt developed in the sand to such an extent as to require washing. Cars for shipping cement became scarce, and a multitude of other troubles hindered the work, so that at the close of the season, on November 1, 1919, only about three-fourths of a mile out of the nine miles had been completed.

The Change to the Present Method

The contracting company saw that a change from the old way of road building was compulsory and so decided upon the method which is now being used and which has proved a success in many ways. It is, to say the least, a very great improvement over the use of the old highway paver with its mile of aggregate on the subgrade and its other inherent weaknesses.

The central mixing plant has been used this year. After mixing, the concrete is delivered to the subgrade in trucks, spread by means of a horse and a special scraper and finished with a finishing machine.



THE CENTRAL MIXING PLANT IN BOX ELDER COUNTY, UTAH

The plant is eqiupped with two 1-yard mixers, each operating independently of the other. Storage is provided, by means of overhead bins, for enough sand, gravel and cement for a half-day's run. The prevailing idea which governed the design was to insure as far as possible steady operation, and this has been realized so far as the mixing plant is concerned.

Many sizes and styles of trucks have been tried, but the 2½-ton truck has proved most successful. Each truck is required to haul two batches of mixed concrete, one batch being dumped from each mixer as the truck

comes into position. A two-batch (10-bag) load seems to slip from the truck better than a larger one, and is very much easier to handle on the grade. Trucks of this size and capacity travel faster than the larger ones, and make better time both loaded and empty.

The state specifications require that the concrete shall be in place within thirty minutes after mixing, and it has been possible to haul the concrete a distance of four miles and keep under this time limit. Very much better results have been obtained where the haul has not exceeded two miles, and from observing results obtained in both cases, the writer has come to think that specifications permitting the use of a central mixing plant should limit the distance over which the mixed concrete is hauled by truck to two miles, as well as limiting the time to thirty minutes.

It has been our experience that materials will separate on the long haul to such an extent as to cause a serious condition, despite the fact that we have used a relative consistency not higher than 1.05, and a rough mix, based upon the maximum size of the aggregate.

Good speed has been maintained, the average for the summer's run being nearly 500 linear feet of road per day, with the haul varying from a few hundred feet to four miles. The maximum run, to date, is 678 feet in 8 hours.

Economical and Sanitary Problems of American Cities

By George C. Whipple

Professor of Sanitary Engineering, Harvard University

MANY thoughtful people to-day are pessimistic as to the future of all large cities, believing them to be physical monstrosities and economic absurdities. As cities grow in size they tend to lose individuality and become alike. Financially, their life depends upon their growth. Anticipation of growth demands extensive public works, and in recent years these have led to increasing per capita municipal debts and taxes. On the other hand, parsimony is not economy, and preparedness is as necessary in sanitation as in war.

It has been my fortune lately to travel in the Orient, and one cannot observe the dense populations there, the reduced natural resources of the land, the lack of animals, and the universal use of human excrement as a fertilizer, without reflecting on the awful waste of nitrogen, which is taking place in the cities of our western civilization, and without wondering what may be the food conditions in America a number of centuries from now. It is not a pressing problem, that of utilization of nitrogen and fats in sewage and garbage, but it is one which should be kept in mind. We throw sewage with its nitrogen and fats into the sea because at the present time it would cost more to recover these substances than they are worth in the market. That may be economically sound, but, nevertheless, it is a waste which some day must be corrected.

In small communities, comfort, which implies health and agreeable conditions of life, can usually be procured at a reasonable cost. In large cities, comfort can also be procured, but only at increasing cost. The question for any community to solve is this—can comfort be secured at a cost which the people can afford to pay? If the limit is approached, will it mean abandonment of comfort in order to maintain solvency? Will it mean repudiation of debts? Or will it mean limitation of growth? The ancient cities were large and prosperous because they were financed from the resources of conquered territory. The modern city is built upon a different basis. If it cannot stand the economic strain, it will fall. Ex-Mayor McClellan of New York, once pointed out that when the tax rate reaches the normal interest rate, the taxes become confiscatory.

In consideration of all sanitary problems the financial element must of necessity control. Relative values must be studied, and then, with fixed appropriations determined by economic considerations, a dollar must be made to buy just as much health and comfort and beauty as possible.

Should Counties Ask Bids from Engineers for Road Work?

Engineers of High Standing Respond Unanimously in the Negative

THE notice reproduced on this page appeared in a local newspaper in the South some time ago. Through the requirement that an engineer must bid for the position of road engineer and furnish a certified check and a bond for the faithful performance of his duty, the engineer is placed in the class of commercial bidders, and no reputable engineer would consider such work. A city or county could secure only second or third rate engineers under these conditions of employment. The method is to be discouraged under all circumstances.

Copies of this notice were forwarded to a number of engineers interested in highway construction and city planning, and summaries of their responses are given below.

A firm of engineers in Philadelphia, acquainted with the situation and conditions in the locality, state that the practice of inviting competitive bids for engineering is unfortunately not uncommon in certain sections, but this particular firm has made it a rule not to enter into any such competitions, as it is felt that the outcome of such methods is usually unsatisfactory to both client and engineer.

A New York consulting engineer states that it would seem as if such a method of securing engineering services would not be successful, for few men who value their standing and future in the profession would care to seek a commission under such circumstances. A professional man's qualifications and experience should be the guide for the client in selecting his services. The request for a bond for the faithful performance of duty is an insult to the profession.

NOTICE TO BIDDERS

Notice is hereby given that the County Commissioners of the County of ..... will receive sealed bids for the engineering upon the roads to be constructed by special road and bridge district number 3, ... County, ..., and that such bids will be received up until 10 o'clock Wednesday morning, October 8, 19... It will be the duty of the Engineer employed by the Board to prepare plans and specifications for the work to be done in the said district, and to supervise the work during its progress, and to do all other things usual and necessary for similar cases. *A certified check for five hundred dollars* must accompany each bid and the successful bidder will be required to *give bond* for the faithful performance of his duty in such sum as may be fixed by the County Commissioners. The Commissioners reserve the right to reject any and all bids and to employ from the bidders the engineer who in their opinion is most responsible and best qualified for the work to be performed. The Commissioners will open such bids as soon after the above time as practical.

(Signed) .....,
Chairman of the Board of County Commissioners.

Attest:
(Signed) .....,
Clerk, Board of County Commissioners.

A well-known Pittsburgh city planner writes as follows: "Local conditions sometimes justify this method in order to protect public interests from the erratic tendencies of low bidders; and, furthermore, the interpretation of certain state laws creates an open question on the expenditure of public funds over a specific sum without competition. Of course, there is usually a rejection clause inserted, but this fact alone does not always guarantee protection. The best protection is to engage the professional services of an engineer who is faithful, capable and honest, with the same confidence and interest that an individual has in his physician or attorney, who is never placed on the auction block."

A firm of New York paving engineers states that "this is a very undesirable method for selecting an engineer and is very likely indeed to result in second and third rate engineering supervision. It would be necessary for an engineer to visit the county and determine just what roads and bridges were to be constructed before he could prepare a bid. No provision is made in the

proposal for any record as to his ability and qualifications, and the deduction to be drawn from it would be that the lowest bidder would probably get the work. Calling for a certified check and a bond for the faithful performance of his duty appears to us to be putting the matter on a commercial rather than on an engineering plane, and if the engineer were incompetent, we fail to see how the bond would protect the county. Personally, we will refuse to bid on work under these conditions, and we believe that the majority of reputable engineers would also decline to have anything to do with it."

A firm of Rochester, N. Y., consulting engineers writes as follows: "Such a proposal hardly deserves comment. Let us hope that it met the fate it deserves, and there can be no question but that it did. No professional man of ability would consider offering himself on such a market. The legal mind that evolved this proposal must have been gathered to the fold under a similar arrangement. For instance, of what value is the certified check for five hundred dollars, except to show that the 'engineer' has that much credit? The commissioners cannot, under their proposal, hold the money, if the 'lucky' man decides to withdraw. We must admit, however, that these commissioners are honest. They throw no camouflage over their real desire, namely, to get the cheapest man at his best figure, while many county and other engineers are selected by such boards for the same reason, although the item 'salary' is only 'among those present' in the advertisement. Times have changed in this respect, however, and engineers are being employed to a much greater extent for their ability, training and experience. The engineer recognizes, and the public is coming to recognize, his true professional standing, and he is not going to barter his talent under any such crude proposal as that mentioned above."

A firm of Pittsburgh engineers of national reputation agree "that this method of securing engineering services is most objectionable and that not only must it necessarily fail to secure the protection which was no doubt the laudable intention of the conscientious public officials who were responsible for it, but, in addition, it is almost certain to lead to the engagement of second and third rate services through awarding the work to the bidder who is willing to cut his price the lowest because of inability to secure engagements on any other basis. We have had in our experience abundant opportunities to observe the excessive cost to municipalities and counties through lawsuits and through failure or unsatisfactory quality of work, of services secured upon similar bases; and we desire to commend The American City for its efforts to induce municipal officials to recognize that the public interest is best served by securing the professional service of reputable and experienced engineers at the usual and reasonable rate of compensation, rather than to attempt to buy engineering as they are accustomed to purchase brick or cast iron pipe."

An Illinois engineer states that it is his "personal opinion that these people will get just exactly what they pay for; in other words, advertising for bids for any professional work, whether engineering or not, is a mistake and cheapens the work all down the line, affecting the contractors and going so far as to bias the attitude of the men. I would as soon think of advertising for bids for this kind of work as I would think of advertising for bids for a dentist or a physician. In every way The American City should discourage action of this kind, and if you are successful you will have rendered a service to the community in which the work is to be done as well as to all reputable engineers."

A municipal and industrial engineer says: "I give very little attention to such abortive efforts to secure engineering services. They are so rare and unfruitful in results and this case is so ridiculous that it does not seem to be entitled to much attention. It would be interesting, however, to know just what results were secured and what type of engineers or surveyors responded and who, if anyone, was selected."

A well-known North Carolina engineer says: "This is the second instance that has recently come to my notice of placing engineers on a par with digging ditches and delivering cast iron pipe. I do not believe that an average engineer would care to bid for a job of surveying in ..... County, ... This is the only instance in which I have seen a certified check required and noticed that the successful bidder would be required to give bond. I suppose that some engineer would bid for this work, but I do not believe that any self-respecting engineer would."

A National Point of View in Education

By George D. Strayer

Chairman of the National Committee on Chamber of Commerce Coöperation with the Public Schools; Professor of Educational Administration, Teachers College, Columbia University

HOW shall we finance education in the United States? Anyone who knows the present situation in education must recognize the fact that we are face to face with a national crisis in education. From an inquiry made by the National Education Association last fall, it was shown that there were 30,000 vacancies among teachers in American schools. Superintendents of schools reported that more than 60,000 teachers entering the schools for the first time this past fall were below the grade of those whose places they took in education and professional training. In the United States only one-fifth of our teachers have had the equivalent of a four-year high school course plus two years of professional training. No other civilized country in the world makes so poor a showing with respect to the qualifications of its teachers.

Abraham Lincoln said:
"I hope that the time may come when our country shall guarantee to all an unfettered start and a fair chance in the race of life."

Startling Facts

There are still communities in the United States in which children have as little as twelve weeks of school provided for them. There are tens of thousands of children who are in attendance in schools in which the language of instruction is not English, but a foreign tongue. There are tax-supported public schools in the United States in which the teachers are unable to speak English correctly, and in which English, if taught at all, is considered a modern foreign language.

The total number of adult illiterates has been variously estimated. That the number is exceedingly large was established by the examinations given in the army camps which showed one man out of four unable to read an English newspaper and to write an intelligent letter home.

No one will deny the importance of a program of education which will provide for the Americanization of the foreign-born. If those who come to us from foreign lands are to contribute most to our civilization, they must be given an opportunity to understand and to appreciate our institutions. It is not merely a matter of teaching them the English language, but quite as much the need for the kind of association with them that will enable us to learn from them as well as to teach them.

That we have neglected the physical well-being of boys and girls was made evident by the physical examinations conducted by the army, which showed one out of every three men unfit for "combat service." We need opportunities for play and physical education in American schools no less than we need better teachers of the subjects now found in our school curricula.

Boys and girls in rural America have not had a square deal. Approximately half of all the public school pupils of the United States are enrolled in rural and village schools. In these schools we have to-day, for the most part, uneducated and untrained teachers. Thirty thousand of these teachers at the present time have no more than a seventh or eighth grade elementary school education. The schoolhouses in which these boys and girls are at work are for the most part without proper equipment in books or apparatus, and in very many cases unsanitary and inadequate in practically every respect. The boys and girls from the farms and from the villages of the United States are coming into our cities. The strength of the city no less than the productivity of our farms is involved in the education provided for these children.

How is the situation to be met? Throughout the United States we have had local and state-wide campaigns for the increase of teachers' salaries, and for money to build school buildings involving increases in state and local taxation for public education. The situation has not yet been met. Teachers

are actually less well paid now than they were in 1914. The increases in salaries have averaged approximately 61 per cent, while the cost of living has increased to a greater extent. Encouragement and aid from the National Government should be provided.

Support the Smith-Towner Bill

The Smith-Towner Bill, which was reported favorably by the Committee on Education of the House of Representatives on Tuesday, January 11, should be supported by all who believe in the future development of our system of public education. The bill provides for the organization of a Department of Education with a Secretary in the President's Cabinet. There are now in Washington more than two score offices, bureaus, divisions, boards, or branches of government concerned with education. An efficient and economic administration of the funds now granted by the National Government in support of education requires that they be organized under a single head. The dignity and practical importance of public education in our national life requires that a representative of education sit in the Cabinet of the President.

The Smith-Towner Bill provides, as well, for appropriations of $100,000,000 to be distributed to the states for the removal of illiteracy, the Americanization of the foreign-born, the training of teachers, the development of a program of physical education and health service, and the equalization of educational opportunity as between rural and urban areas. This encouragement offered by the National Government is by the provision of the bill to be met by expenditures by the state in every case as large in amount as that received from the National Government. It is provided, as well, that a state, in order to participate in the distribution of funds, must maintain schools for all its children for at least twenty-four weeks in the year; that it must have a compulsory education law requiring attendance between seven and fourteen years of age; and that it shall enact a law requiring that the English language shall be the basic language of instruction in the common school branches in all schools, public and private.

Education: an Investment and an Insurance

There are those who have suggested that we cannot afford this increased expenditure for public education at this time. The most adequate reply to this type of objection is found in the argument advanced by the British Minister of Education in advocating greatly increased expenditures for education during the period of the war. In answer to his opponents he declared that England could not afford not to spend vastly increased sums of money for education. He pointed out in no uncertain way that money spent for education is to be considered as a productive expenditure. In America to-day we may well ask ourselves whether we may hope to hold our own in the economic world struggle which lies ahead of us if we fail to provide adequate education for all our people. When one considers, as well, the influence of the bolshevistic or anarchistic agitator over the illiterate or foreign-born member of our society who has little or no appreciation of the meaning of our American democracy, he may well reach the conclusion that education is at the same time an investment and an insurance.

Our National Government has encouraged education from the very beginning. With the formation of states out of the Northwestern Territory, land was granted in support of education. As each state has been admitted to the Union since that time, grants of land in support of the public schools of the state have been made in increasing amounts. Since 1863 appropriations have been made for colleges of agriculture and mechanic arts. More recently money has been provided by Congress for the development of vocational education of high school grade. The suggestion that the nation encourage the states, as is provided by the Smith-Towner Bill, is in line with a well-developed policy. Taxes paid to the National Government need not necessarily be increased in order to provide the funds. In the estimates submitted to Congress it is proposed to spend sixteen hundred million dollars for the War and Navy Departments. It may well be argued that one hundred million dollars taken from this amount and expended for education would bring vastly greater returns to the United States. We have less to fear from the enmity of a foreign people than we have from the lack of understanding of our democracy by those who constitute a very considerable percentage of our population.

Courtesy of the Old Colony Magazine

IMMIGRANT CHILDREN JUST LANDED AT ELLIS ISLAND, NEW YORK

Their future usefulness to the community depends largely upon the public schools. The cost of their education represents an investment in American ideals

State and Local Authority Upheld

Arguments against the enactment of the Smith-Towner Bill have been advanced by those who have suggested that the proponents of the bill seek to centralize the control of education in the National Government. Nothing could be farther from the spirit and express provisions of the bill. In Section 14 of the bill, as reported on January 11, are the following provisions: "That courses of study, plans and methods for carrying out the purposes and provisions of this act within a state shall be determined by the state and local educational authorities of said state, and this act shall not be construed to require uniformity of courses of study, plans and methods in the several states in order to secure the benefits herein provided; and provided further, that all the educational facilities encouraged by the provisions of this act and accepted by a state shall be organized, supervised, and administered exclusively by the legally constituted state and local educational authorities of said state, ..."

If anything further were needed to establish the fact that the centralization of authority or control of education is not contemplated, it can be found in the resolution favoring the passage of the measure adopted by the National Education Association at its annual meeting at Salt Lake City last July. A commission of this association drafted the bill originally and has supported it vigorously during the past eighteen months. The resolution reads as follows:

"We urge the immediate passage of the Smith-Towner Bill by which federal participation in the support of public education is provided and which, at the same time, preserves the autonomy of the state in the management of its schools. We condemn the efforts of the enemies of the public schools to defeat this measure, particularly by stigmatizing it as a measure which involves national control of education. Such control is not only clearly unconstitutional, but it is out of harmony with the spirit of American institutions. This Association pledges itself unreservedly to oppose any movement or proposal that would centralize control of the public schools."

Wide Endorsement of the Bill

The Smith-Towner Bill has the warmest support of those responsible for the administration of public education in the United States. Every state superintendent of schools, with possibly a single exception, has approved the measure and is working for its passage. The state, city, and county superintendents of schools in their last annual meeting, with more than four thousand men present, unanimously endorsed the measure. It is even more significant that laymen's organizations have debated the question and have endorsed the measure and are working for its passage. Among those that have given their unqualified support are: American Federation of Labor, American Federation of Teachers, General Federation of Women's Clubs, National Congress of Mothers and Parent-Teacher Associations, American Library Association, National Council of Jewish Women, Association of Collegiate Alumnae, Patriotic Order Sons of America, National League of Women Voters, and National Society Daughters of the American Revolution.

America must wake up if she is to hold her place among the great peoples of the world. A failure to provide educafion for all the boys and girls of America is to invite disaster. The most direct and effective channel through which the forces of social control can operate is the public school. Ignorance cannot be segregated. The failure to provide education in one part of the country is a weakness that affects the whole country. If we are to make good the promise of democracy in terms of an equalization of educational opportunity, the nation must encourage and aid its schools. May we not look forward to the realization of the ideal of our democracy as expressed by Abraham Lincoln when he said:

"I hope the time may come when our country shall guarantee to all an unfettered start and a fair chance in the race of life."

Combined Open Air Swimming Pool and Hockey Rink at Milton, Mass.

By Robert Spurr Weston
Weston & Sampson, Consulting Engineers, Boston, Mass.

EVERY boy, every girl for that matter, needs a "swimmin'-hole" or its equivalent. Fortunate indeed is the youngster who has access to one, or to clean and copious streams, or to pond, bay or ocean. Not all are so situated. Frequently

"The bridge of the railroad
now crosses the spot
Where the old divin'-log
lays sunk and fergot."

Often where there are the most who desire to bathe, the streams are small or polluted, or the waters are unsafe. For such, artificial pools and ponds are being provided in increasing number. These pools have been very popular, and usually the number of users has been underestimated by their designers.

THE SWIMMING POOL, MILTON, MASS., SHOWING HOW IT HAS BEEN DESIGNED TO FIT THE CONTOUR OF THE GROUND

Such a pool has recently been completed in Cunningham Park, Milton, Mass., one of the southerly suburbs of Boston. This pool is so arranged that it may be converted into a hockey rink in winter, thus greatly extending its yearly period of service.

The Source and the Site

The source of supply for the pool is a small, clean brook which rises in the nearby Blue Hills of the State Reservation. In summer the discharge of this brook is frequently less than 100 gallons per minute. For that reason and others, the contents of the pool are circulated continuously through a filter, a method commonly used for keeping indoor tanks in proper condition.

The site is a low-lying meadow, which was formerly flooded in winter. The soil consists of wet, slippery clay and many boulders, and, while water-tight, obviously increased the difficulties of construction. Around the meadow in which the pool is located, on the bordering hillocks, are fine old evergreens and second-growth hardwood trees of good size, which have been supplemented recently by plantings of white pine and hemlock, designed to give the pool a natural setting as shown in the illustration above.

Design of the Pool

The pool is irregular in shape. The shore lines are curved. The outlines of the pool are clearly shown in the photograph. Its greatest length is about 315 feet, and its average width about 150 feet. Its greatest depth is 8 feet, and there is a sand beach with shallow water for wading, around the whole pool. This beach slopes towards the concrete lining of the deeper section. This lining covers an area of 180 by 80 feet, which are the dimensions of the hockey rink. Around its border are sockets which support stanchions. These project 4 feet above the water, and are of 2-inch pipe, spaced 8 feet center to center. They support the 16 by 4-inch sections of the wooden barrier which is placed about the hockey rink in winter.

The pool and rink are well lighted from overhead by four 750-watt Mazda lamps, and are used in the evenings, both in winter and summer, thus giving pleasure to many who otherwise could not enjoy them.

The pool is provided with a chute and a diving float. The chute is located at the east

end, in shoal water, and is used by small children and other non-swimmers. The diving float consists of a platform 13 by 18 feet, supported upon twenty 50-gallon oil barrels. On one side of the float is a spring-board of the usual type. On the opposite side is a spring-board with a low platform above it, arranged so that bathers may jump from the platform to the spring-board. Between the spring-boards is a diving-stand with a platform 4 feet wide by 5 feet 6 inches long, elevated 7 feet above the surface of the float.

The Filter

The sand filter, which is of the slow or English type, is 18 by 30 feet in area, and is located in the south bank of the pool. It is built of concrete, with roof of reinforced concrete, the latter covered with earth over which vines have been planted so as not to detract from the natural appearance of the pool. The filter contains 3 feet of sand supported on graded gravel and underdrained in the usual way, with tiles. Adjoining the filter is a small house, 10 feet square, which contains the devices for regulating the filter, and a 1½-inch motor-driven centrifugal pumping unit which circulates the water of the pool through the filter and also empties the lower section of the pool, which is too low to be drained by gravity. The walls of the filter house have a stucco finish, and its roof is covered with "color-blend" asbestos shingles.

The waters of the brook are diverted to the pool by means of a low dam, and flow through a 6-inch pipe-line, which discharges into either the filter or the pool, as desired. During most of the year the brook water is so clear that its filtration is not necessary, but if it is not clear, the pool can be filled through the filter. The pool holds about 750,000 gallons of water, and the filter is designed to circulate its contents weekly.

The Pool is Popular

The hockey rink was used during the winter of 1919-20, but the pool was not used until the last of July, 1920. The pool came into favor instantly, and although the summer was below the average in coolness, it was used beyond all expectation. The Trustees estimated that as many as 250 persons a day might use the pool, but on the last Saturday in August, five hundred, mostly boys and girls, availed themselves of the privilege. Over 8,000 bathers used the pool during the protracted hot wave in August, 1920.

Cunningham Park is a large estate held in trust for the benefit of the citizens of Milton. The property, over 200 acres in area, consists largely of forest and meadow, with some arable land. Within the park, the Trustees have established a convalescent home, and a gymnasium with bowling alleys, tennis courts, etc., and have flooded the meadow for skating during the winter. None of these means of amusement, however, have been so popular with the residents of Milton as is the new swimming pool. This experience is similar to that of other places where open-air pools have been constructed. Nothing costing so little seems to please so many people so much.

Keeping the Pool Sanitary

The sanitation of the pool has been a matter of deep concern. Bathers were permitted to use the pool before any bath-house could be built. The boys and girls came in their bathing-suits, or changed into them in the near-by gymnasium. It was impossible to insist upon baths before they entered the pool. Bacteriological samples have been collected weekly, and the findings are good, considering the promiscuous use of the pool. The numbers averaged 672 per c. c., which is considered quite remarkable in view of the fact that the brook water sometimes contains 500 bacteria per c. c., although the average is less than 400 per c. c. This is a fair bacteriological condition, and is due to the disinfecting action of light and other agencies of self-purification, and to the low bathing load due in turn to the large size of the pool. It is considered very important to operate the pool under bacteriological control.

Because its construction was in wet clay and boulders, the cost was abnormally high, even for the present times. With filter, dam and connecting piping, it was about $40,000. In most places this cost could be reduced materially even with prevailing prices for materials and labor.

The plant was designed by Weston & Sampson, consulting engineers, with the advice of Loring Underwood, landscape architect, all of Boston.

The Municipal Forest in Fitchburg, Mass.

By G. A. Hubbard
City Forester, Fitchburg, Mass.

FITCHBURG, a city of hills, in Worcester County, Mass., located fifty miles from Boston, with a valley running from the Leominster line through the heart of the city to the Westminster line for a length of four or five miles, lined with manufacturing plants whose products go all over the world, was the first city in America to establish a municipal forest. On December 29, 1914, during the administration of Hon. B. A. Cook as mayor, a petition was introduced by Dr. D. S. Woodworth, Chairman of the Park Commission, as follows:

Ordinance for placing under control of the City Forester certain tracts of land belonging to the city.

Ordered: that the tracts of land herein mentioned and belonging to the city, be and hereby are placed under the supervision, control and management of the City Forester as a part of the public domain, to be devoted to the culture of forest trees and, incidentally in some measure, to the preservation of the water-supply of the city:

First, a tract of land of approximately 50 acres, located on Turnpike Road (so-called) and known as the Wanoosnoc Lot.

Second, a tract of land of approximately 31.24 acres, located on Rindge Road and known as the Taylor Farm.

Third, two tracts of land of approximately 16 and 8 acres, respectively, and located on the Ashby Road, and known as the Raymond Lot.

The order was adopted in concurrence, presented to the Mayor and approved by him December 29, 1914.

Description of Tracts

The land forming the forest is composed of four lots with a total of 109 acres and situated in different parts of the city. The upper Raymond tract consists of 10 acres on the boundary line of Fitchburg and Ashby. This 10 acres is covered with hard wood of about 25 years' growth, and is in good growing condition. A little west of this tract is the lower Raymond Lot, which consists of 21 acres. More than half of this area is well covered with white pine of about thirty years' growth, the remainder of the lot being in hardwood, and a small portion of pasture covered with juniper. A small part has been cleared preparatory to planting with pine.

A little nearer the city is situated the Taylor Lot of 31 acres. About 19 acres of this lot is covered with pine of probably 40 years' growth. The remainder, aside from a small portion that naturally seeded, has been planted with white and Scotch pine. A

SMALL PINES WITH FIRE HAZARD OF DRY GRASS

A STAND OF WHITE PINE—BETWEEN 30 AND 40 YEARS' GROWTH

portion of this planting has been in for five years, and the rest of the lot has been planted three years. The planting and the condition of this lot make a good object lesson, and show conclusively that planting pine where natural seeding does not do the work is a practical undertaking. After the young stock becomes established,—which usually takes the first year,—rapid progress is made. During the third year the growth is frequently from 1 to 1½ feet, and after five years individual trees have been noticed with a new growth of fully 3 feet.

The Wanoosnoc Lot is situated on Wanoosnoc Hill in the southern part of the city adjoining the Leominster line, and has an area of 47 acres. About 15 acres is covered with hardwood growth and chestnut about post size. A portion of the chestnut has been cut and the remainder must soon be cut, as the chestnut blight is making headway and nearly all the trees are affected. This disease is reducing the chestnut stands in Massachusetts very rapidly, and within a few years it will be impossible to find chestnut timber for poles, posts, plank, and many other important needs which this valuable tree has filled. The good old days of chestnutting, which was often a source of revenue as well as pleasure, will be a thing of the past, remembered only by the older people, who will tell the younger generation about picking up chestnuts by the bushel when they were young. It is hoped to find a method of fighting the blight.

Success of the Project

Forestry firms doing planting by contract usually guarantee from 70 to 80 per cent of planted stock to live, but in the experience of Fitchburg a much larger percentage is made to survive. The planting done during the last three years shows over 90 per cent alive to-day. Of course sufficient rainfall during the first month or two is essential. Assuming that the trees are properly planted and there is reasonable precipitation, the per cent should show well above 90. The earlier the planting can be done after the ground opens, the better.

Waste land is a liability and usually entirely non-producing. This liability can be changed to an asset by adopting reasonable and inexpensive methods which are beyond the experimental stage and have been demonstrated as practical, good business. Many states are to-day buying up and reforesting waste land, a plan which is being followed by many progressive individuals and which should be adopted by municipalities.

Many cities and towns already own land used as watersheds or otherwise which could be planted. The main thing is to plant, whether it be done officially through a municipal forest or not. Every tree warden, every park board, every water board, and every individual who has land suitable for this purpose should do a little each year. The surroundings of reservoirs and sources of supply must be wooded to a certain extent.

These many acres can be planted, and as they reach harvesting age, can be thinned and replaced, making a source of revenue, as well as helping to conserve moisture and to improve appearance.

The Necessity of Fire Lines

Fire lines must be maintained in planting, for the fire menace is greater when the trees are small than later on. Fire not only destroys the young trees but also reduces the humus cover, which is fertilizer and retains moisture. Especially is this true for old pasture land. During the first five years, until the stand is capable of making shade, all sorts of weeds and grasses make a fire hazard which should be guarded against by fire-breaks; then, should fire start it could be handled without sacrificing the whole. Forest fires cause a loss of over twenty million dollars a year.

A fire line cleared of brush from 10 to 20 feet wide around or through a lot will insure protection from approaching fire by giving a position from which to fight. Fire notices should be posted in conspicuous places each year, and replaced if removed.

In the larger areas of newly planted stock the fire-break is of great importance, for the grasses form a fire hazard which is nearly always like tinder, drying in a few hours after rain, and as fire creates its own wind, sometimes traveling at race-horse speed. In the view on page 122 is shown a lot entirely of white pine of from 30 to 40 years' growth. The shade causes moisture to be retained, and the fire-lines need be only around the outside as protection from adjacent lots. Cases of fire loss in pine of this size are rare, for any serious damage would be caused by crown fires, which would come from the outside and be very intense.

The Value of Reforested Land

The present high prices of lumber are a great temptation for a man who has waited a long time for his pine lot to mature, and many are putting pine into money too soon. The writer has seen large quantities cut when to have left it a few years would have been the better investment. Owners of pine lots need have no fear of a slackening demand or a diminishing price, for waste in handling due to the old idea that timber resources are inexhaustible is gone, and reason and common sense are urgently calling to intelligent people's attention the duty of reforesting. This must be emphasized generally, not only to state and city forestry departments, but to individuals. Those acres which are not working should be made to pay. The initial expense is small, and after a few years comes the steady increase in value.

In the spring of 1919 the Forestry Department of Fitchburg planted for an ex-mayor of the city an area taking 125,000 pines. This man is 65 years old, and there is no thought of his cutting these trees at maturity. He is planting for the future, and his pleasure in watching the trees grow is a sure reward.

Land suitable for this purpose can usually be obtained at very low cost, probably around $5 per acre. Planted 6 by 6, it costs about $12.50 per acre for the transplants, and with $8 for the cost of planting, the total cost is $25.50 per acre. In some states land so improved is exempt from taxes for a period of years. This is not all the probable expense until maturity. In large areas a few replacements may be necessary, but usually, provided 90 per cent live, the few trees that die are so scattered they are not replaced.

City Forests Invaluable

In state or individual planting white pine is generally used, being of more monetary value than any other. In city forests, from an educational standpoint, a few Scotch and Norway pine may well be planted. In our locality, where the gypsy moth is at home, it is not advisable to have pine and hardwood together. The hardwood should be removed, leaving the pine, and thus making it immune from moth pests. In lots of hardwood growth, white ash is recommended for planting, as it is practically moth-proof.

The results visible in the Fitchburg municipal forest at this writing show conclusively that tracts of land not suitable for crop culture can be utilized and made to produce valuable products. The value of this work for a community or an individual is of far-reaching consequence, and demonstrated success is an incentive for increased efforts.

Of course in the forming of a municipal forest from four-year-old transplants a considerable period of time must elapse before the stand shows that it is a practical business proposition. Rather than having to begin from the ground up, it is advisable to purchase land at a higher cost than that of

waste land—for example, a lot partially covered with young growth, giving opportunity for planting. Private owners or state plantings can use with success the waste land; but with a city, if the land is to serve a recreative and instructive purpose, a partly grown portion is to be preferred.

The acquisition and maintenance of a municipal forest ought to be an easy matter for any city or town. Some man who is alive to the benefits must move, and the beginning requires a hard push, but after the first lot is obtained and a start made, the positive results soon and easily obtained will warrant enlarged operations. In many places there are people public-spirited enough to give for this purpose land that is not suitable for crop cultivation. Trees and rocks are the best of friends.

The last session of the Massachusetts Legislature passed a bill providing for the purchase and planting of 100,000 acres of land. Many lumbermen appeared in support of the measure, which is ample proof of the need of insuring our future lumber supply.

Traveling Forestry Exhibits for Public Libraries in New York State

New York State College of Forestry at Syracuse Spreads Educational Material Throughout State

THIRTY-SIX libraries in New York State through coöperation with the State College of Forestry will have an opportunity to demonstrate to their patrons the different phases of forestry and what forestry is doing in the state to help develop idle lands. This demonstration is made by traveling "pocket exhibits" which are sent to the various libraries by the College of Forestry. The exhibit consists of eighteen panels divided into sets of six panels each. Each set is in a town or city for two weeks and is then sent on to the next town on the circuit and the second set installed for a second fortnight.

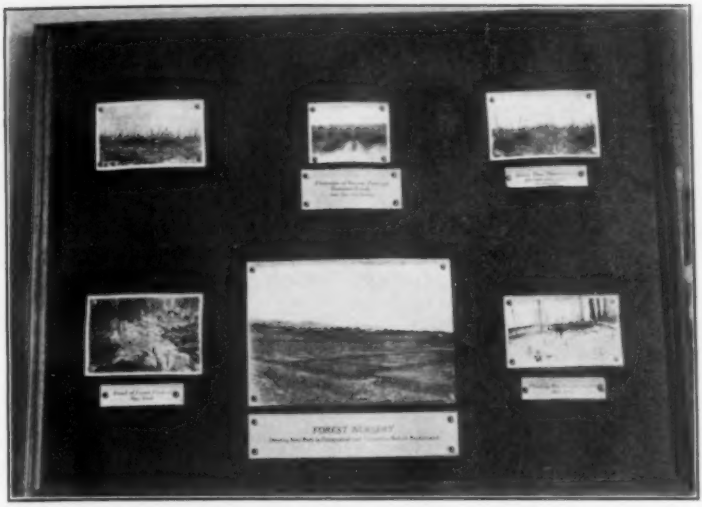
The Nature of the Exhibits

How the ambrosia beetle destroys trees by growing its own feed in a form of fungus which discolors and impairs the value of the timber, is graphically shown by Set No. 1. The work of this beetle which, like that of the elm leaf beetle, threatens destruction to the beautiful shade trees of New York State, is illustrated in pictures and samples of the affected trees. The ambrosia beetle grows within the holes it makes in the wood, and damages lumber by running individual food gardens. The work done by fungus is also shown, with the story of the blister rust, which has worked havoc among the white pines of America and whose ravages have caused a nation-wide campaign to eradicate the pest.

The reforestation panel included in Set No. 1 shows what happens when cut-over lands are allowed to be burned and the erosion which follows makes what was once a productive forest a waste of barren rock. The panels are designed to show that New York should add to its forest wealth by making its forest lands grow crops of trees.

Set No. 2 shows how the waste of the forest can be converted into clothes-line and other such substances. Here is shown the progress of the tree from the forest to the clothes-line. First, it is converted into pulp by grinding, and is cooked and treated in the paper mill until it is ready for the next step in the process of manufacture. It is converted from pulp into kraft paper, a tough type of paper, which is then twisted and treated until the ground wood paste has been turned into clothes-line that will not soften or weaken when the Monday wash is hung upon it. Another feature of the exhibit is the silk made from what was also the waste of the forest. To-day artifical silk stockings are being made from sawdust, by chemical conversion of the wood into cellulose, and its weaving into fabric. There were 15,000,000 pairs of artificial silk stockings made from wood in America last year.

This set includes a panel which is of particular interest to those who are thinking of taking up forestry as their life work, as it shows typical episodes of student life. Pictures show the students not only in college,



SAMPLE PANEL OF THE TRAVELING EXHIBITS

but also in summer camp at Cranberry Lake and at the State Ranger School at Wanakena.

The story of forest recreation and city forestry is graphically told by art photographs in the third and last set of the pocket exhibits. One panel, for instance, shows the municipal forest of Los Angeles, which has a public camping ground in the Angeles National Forest, known as Camp Seeley, where whole families are allowed to go at the lowest possible cost, for two weeks each. It costs only about $9 a week per person, and for this amount each family is provided with its food from the camp kitchen, its own cottage, and even the railroad fare of about 75 miles to and from Los Angeles.

How the city forester works to give a city the proper types of shade trees and to keep the streets and parks beautiful from the standpoint of the forester, is also shown, as well as the development of school and home grounds. Various pictures of the Adirondack forest, an Adirondack lean-to and a state camp fire are also displayed in this set.

The exhibits are furnished by the College of Forestry, and the libraries pay the express charges between the cities on the circuit, thus carrying the gospel of forestry to many thousands of people.

Highway Departments Store Road Material in Winter

Attention has been called in the editorial pages of THE AMERICAN CITY to the need for shipping and storing road-building material during the winter and early spring, in order to expedite construction work in the short open season, particularly in the Northern States. We beg to call attention to some instances where governmental units have taken advantage of this method of expediting road construction.

Ogden, Utah, shipped in sufficient material for 20 miles of roadway last winter, and this road was completed in record time during the 1920 construction season. The state of Delaware has followed this practice for three years. The Board of Freeholders of Passaic County, New Jersey, has acquired a central storage yard for stock piling road materials this winter. An Illinois city, Belleville, has already stored cement for next season's work.

A number of states, recognizing the advantage of the early transportation and storage of material, have made it possible to pay the contractor in full or in part for the material when it is delivered. It can now be done in the following states: Alabama, Arkansas, California, Colorado, Connecticut, Georgia, Delaware, Idaho, Illinois, Iowa, Kansas, Maine, Maryland, Minnesota, Michigan, Nebraska, New Hampshire, New York, Rhode Island, South Dakota, Tennessee, Virginia, West Virginia, Wisconsin, Wyoming, District of Columbia, Oregon and Vermont. In ten other states such procedure is not possible at the present time under existing statutes. In only three states is there any sentiment against this procedure.

"House-Cleaning" for Water-Mains

Flushing of Mains in Terre Haute Worthy of Note by Municipalities

NO matter how good the water-supply, nor how clear and sparkling the water sent into the service mains of a city, there is bound to be some accumulation of sediment, just as there is some dust always to be found in the home that is swept and dusted daily. In order to remove this sediment and to keep the mains in good condition, the Terre Haute Water Works Company, Terre Haute, Ind., flushes out the mains two or three times a year. Extra help is secured, and the hydrants nearest the station are opened up so that there are six 2½-inch streams discharged at one time with two nozzles to a hydrant. As soon as the water from the hydrant nearest the station is running clear, and while it is being closed, the man at the fourth hydrant is just opening that up and the man from hydrant number one goes to number five. In this way the discolored water is confined to a limited area. Freshly filtered water follows up the flushing, flowing through the pipes that have been cleaned.

When the hydrants in the business district are being flushed, the gang goes out about 4:30 in the morning, so that the work can be done before heavy traffic appears.

In order to do effective cleaning, it is necessary to materially increase the velocity or rate of flow in the mains. Hence, three hydrants are opened at one time. In order to get the greatest benefit from the flow, the water is permitted to run out onto the street instead of running through a hose to the nearest catch-basin, because the friction of the hose would reduce the rate of flow.

We Are Cleaning House

Twice a year, we flush our street mains, which is similar to Cleaning House, thus following the example set by all good housekeepers.

Cleaning house is expensive and not the most agreeable task in the world, but we believe the good people of Terre Haute are entitled to the best possible service.

If the water does not become clear in a little while, kindly advise us.

THE TERRE HAUTE WATER WORKS COMPANY

TELEPHONE—215

THE NEWSPAPER ANNOUNCEMENT OF THE "HOUSE-CLEANING"

In Terre Haute it usually takes about 6,000,000 gallons to flush the hydrants, and the extra labor amounts to several hundred dollars, in addition to the value of the water used for flushing. This work virtually amounts also to a testing of the hydrants, so that it is insured that they are in good condition for use by the fire department. On one occasion two hydrants were found broken below the ground. They had evidently been hit by automobiles or trucks, and no notification had been sent to headquarters.

It would be well for more municipalities to seriously consider this proposition of regular flushing of the service mains, in order that there may be fewer complaints by consumers after fires. If sediment is regularly removed through flushing, there is no opportunity for such complaints.

Maintenance Cheaper Than New Roads

By Philip P. Sharples

THE 1920 road program throughout most of the United States was a program reduced at every point until in reality it amounted to little beyond an attempt to finish work begun during the previous year. Road officials were forced to see what could be done with the roads they already had, or, in case construction was absolutely necessary, were obliged to turn from more expensive types of road surfacing to the contemplation of cheaper means of providing a road suitable for modern traffic.

The money that can be saved by revamping an old road, rather than reconstructing it, may best be stated in figures: to rebuild a road of standard 18-foot width with any of the modern first-class pavements costs in the neighborhood of $40,000 for the top alone, irrespective of the grading and drainage. The interest on this money at the present time, even at 5 per cent, amounts to $2,000 per year. We must also provide for replacing the road when it is worn out. Giving the road the extraordinary long life of 20 years would call for $2,000 a year to be set aside for replacement. In addition to this, every road requires maintenance and up-keep, and this can hardly amount to less than $500 per mile per year through any period of years. We thus have as a total of our yearly expenditures, in case we build a new top, $4,500 per mile per year. In other words, if in any way we can so take care of the road that is already in use as to make it acceptable to the traveling public for anything less than $4,500, we have saved the city, county or state money. This is an aspect of road building that has not been popular with road engineers. It has been more fun to design and construct new roads than to devise means for caring for our old roads and then carrying out the work economically and acceptably.

Pennsylvania's Road Thrift

The state of Pennsylvania has realized for some time the merits of taking care of

WHITEHALL ROAD, MUSKEGON COUNTY, MICHIGAN
This photograph shows the contrast between an untreated gravel road and one which has received annual treatments with Tarvia "B" and coverings of limestone chips since 1915

the roads they have. If this had not been so, it would not now be possible to travel over the Lincoln Highway from one end of Pennsylvania to the other with comparatively little discomfort. It is true that the old road breaks up in places in the spring, but these are put in shape again and the road receives maintenance by patching with some of the new road-patching compounds, and by surface treatments of bituminous materials. These simple means for caring for the state's macadam roads are sufficient to keep them going except where the traffic becomes extremely dense and heavy. Even here the state has found means of resurfacing the old macadam roads at a comparatively light expense so that they may again carry the traffic of trucks and automobiles over a smooth and easy-riding surface. The writer refers particularly to the work that has been done on the Lancaster Pike going out of Philadelphia.

Other states have devised other methods of handling the same problem; for example, the work on the old National Pike in Maryland, carried along year by year in a very acceptable way with bituminous surface treatments. The state of Massachusetts, the oldest in a constructive highway policy, has improved year by year its original highways by very simple methods of resurfacing. The penetration method has given excellent results, and even the heavy motor truck traffic in the vicinity of Boston is largely carried on this type of road. Similar methods to that used on the Lancaster Pike have also been used in Massachusetts with success.

The problem is the same in cities and towns. Philadelphia, for example, has a large mileage of old macadam streets that it can ill afford at the present high prices to throw away. William H. Connell, former Chief of the Bureau of Highways, showed what could be done in the residential district on this type of road by smoothing up and rebuilding many miles and then surface-treating them with tar materials. The work started by him is still carried on by the city.

Pennsylvania state highways traverse many incorporated boroughs. Some of these evince the pride of ownership and have put the streets traversed by the state highway in good condition; others have lost their sense of pride, or else abide their time, thinking that if the road is bad enough the state will step in and help them. These borough thoroughfares are a neglected part of the state's programs for good roads. Some of the well-known cheaper methods of road building would be applicable to these now abandoned thoroughfares. The main street of Leroy, N. Y., a splendid, wide thoroughfare between the stores, traversed by the East West Mohawk Valley Trunk Line, was in deplorable condition last year, and it was thought it would be necessary to appropriate a large sum of money to rebuild it. The town engineer, however, seeing that the appropriation would not be possible for the town's finances, begged to be allowed to try a simple experiment in rescarifying, reshaping and treating with a cold tar application. The result was a splendid success, and the street is carrying a heavy traffic and is a pleasure to the town's inhabitants.

The Looks of the Town

By L. S. Cole

Most of our cities depend primarily on geographical or geological location for their prosperity, yet some of those most fortunate in these respects often fail to attract desirable industries, and even frequently fail to hold those already located within their borders. In many cities "booster" clubs tell of the wonders and glories to be found therein, and when we approach these cities, we are greeted with the most uninviting, tumble-down assortment of buildings imaginable. Our railroad depots are sometimes located in the worst parts of town. How can we expect the town seeker to be other than disappointed? How else is he to measure the community service we have to offer? Surely the town that is made pleasant to live in from the standpoint of merchant, workman, and property owner alike is assured of peace and plenty. And just as surely, the town that fails, through lack of foresight or planning to provide the proper civic service will pay the penalty due to the stultified growth and decadence which must surely overtake its industries.

Acknowledgment.—From an address delivered before the annual convention of the Indiana Real Estate Association, Muncie, Ind.

Remodeling and Enlarging the Water and Light Plant at Perry, Oklahoma

By W. C. Harmon, Jr.

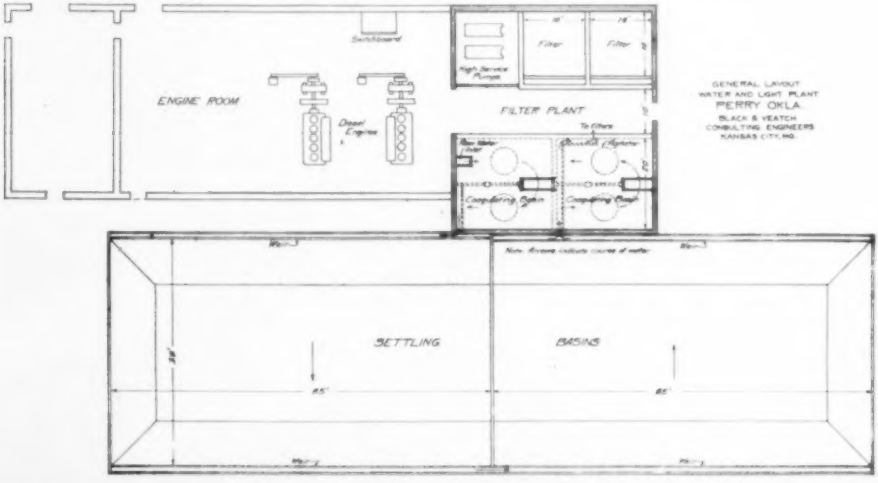
EXTENSIVE improvements to the water and light plant have just been completed by the city of Perry, Okla. These include a concrete dam, a flow line of 12-inch cast iron pipe, a low-service pump pit, and motor-driven centrifugal pumps, reconstructed settling-basins, new rapid sand filter plant of 1,000,000 gallons per day capacity, new motor-driven turbine pump for high service, Diesel oil engines and generators to replace the present steam power plant equipment, and necessary changes to buildings.

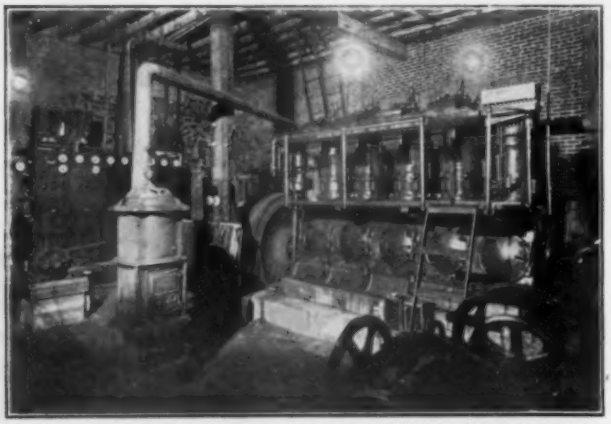
INTERIOR VIEW OF PERRY, OKLA., FILTER PLANT

The water-supply had previously been secured from two impounding reservoirs, one of about 20,000,000 gallons capacity located on the west side of the town, the other in the hills southeast of the town, having a capacity determined by its drainage area of about one square mile. Both of these are connected to the new plant. The low-service pumps can draw from the pipe line from the west reservoir, while the reservoir in the hills is high enough to discharge directly into the filter plant.

The Dam and the Reservoir

To secure the needed additional water-supply, a new impounding concrete dam was built in Cow Creek, just above the water plant. The dam is built of mass concrete,





ONE OF THE DUPLICATE SETS OF 180-HORSE-POWER DIESEL ENGINES

290 feet long, 21 feet high above low water, and 23 feet above the rock on which it is founded. There are reinforced concrete wing-walls at each end of the dam, having a total length of 63 feet on one end and 73 feet on the other. The dam is designed to pass a flood 3 feet deep over its crest. A notch in the crest at the location of the stream channel, 6 inches deep and 30 feet long, gives an opening for the ordinary flow of the stream.

The new reservoir thus formed has a drainage area of 30 square miles, a water area of 30 acres, and an average depth of 9.5 feet, with a total storage of over 100,000,000 gallons and an available storage of 83,000,000 gallons. A dam and reservoir of the Santa Fé Railway will be submerged by the new lake, and in figuring the available storage a maximum allowance is made for water used by the Railway Company. This reservoir, with the two present reservoirs, will give the city sufficient storage capacity to supply 500,000 gallons per day over the longest known dry period.

There was no record of the consumption of water available at the time the designs were made, but it has probably been less than 200,000 gallons per day. The population was estimated at about 4,000, so that the 500,000 gallons per day from the plant will be sufficient for some time to come.

An intake manhole is built in the dam, in which are three sluice-gates at different elevations so that the best water may always be used. Each sluice gate is protected by a screen of bar iron with 2-inch clear opening. From the intake manhole a 12-inch cast iron pipe leads to the low-service pump pit.

The pit for the low-service pumps is built of reinforced concrete, 12 feet square and 24 feet deep. This is low enough so that water reaches the pumps by gravity most of the time. There are two 400-gallon-per-minute centrifugal pumps, horizontal, direct-connected to three-phase, 220-volt induction motors. The water is discharged into the first mixing basin of the new plant from these pumps.

The old settling basins were revised and used in the new layout. The two basins were each 50 feet by 85 feet on top, total depth 10 feet, and concrete-lined with sloping sides. They were separated by a thin buttressed partition wall. The capacity of the basins was increased by building a wall on top of the outside curb, increasing the depth to 13 feet 6 inches, with a water depth of approximately 12 feet. This was required so that the filters could be located at a desirable elevation, to furnish an anchorage for the weirs and to lengthen the period of sedimentation. Inlet and outlet weirs were built in each basin so as to make the flow uniform, and the partition wall was raised to the same height as the outside walls. The water now passes through one basin and then through the other. The revised basins have a capacity of 650,000 gallons, which gives a settling period of 15½ hours, when the plant is operated at a rate of 1,000,000 gallons per day. The average speed of horizontal travel is 1/10-foot per minute for the 1,000,000-gallon rate.

The Filter Plant

The new filter plant is built at the end of the power plant and adjoins the settling basins. It includes two coagulating basins, two filter units, and a clear well, and is built of reinforced concrete surmounted by a building of stone masonry and stucco on metal lath.

The two coagulating basins each have a period of flow of approximately 50 minutes at the rate of 1,000,000 gallons per day.

They are equipped with mechanical agitators for mixing in the coagulating chemicals, consisting of two steel paddles in each basin, all driven by a water motor. The water enters one basin from the low-service pumps, and may be dosed with either lime or sulphate of alumina. After passing through the coagulating basin, the water goes through the settling basins and enters the other coagulating basin. It is there dosed with sulphate of aluminum, and after mixing flows to the filters.

There are two filter units of reinforced concrete, each 14 feet by 14 feet in plan. Operating at a normal rate of 2 gallons per minute per square foot, the two filters have a total rate of approximately 1,125,000 gallons per day. Since the estimated maximum average consumption is less than half of this, 500,000 gallons per day, it may be supplied by about 11 hours' run of the filter plant. This capacity allows for the supplying of extraordinary demands and for operation with one unit out of service.

The filters are of standard construction, with a 30-inch bed of filter sand supported by an 18-inch bed of graded gravel. The underdrains consist of a cast iron manifold tapped for wrought pipe laterals, 6 inches center to center. The lateral pipes are placed above the concrete floor, and have 3/16-inch holes on the bottom, 4½ inches apart, with alternate holes staggered from side to side, having an angle of 90 degrees between them. Bronze bushings are tapped into the lateral pipes for these openings. Venturi type effluent controllers are used, with a float controller butterfly valve to stop the filter when the clear well is full. Float-type loss-of-head gauges are used.

High velocity wash, without air, is used. There are three cast iron gutters in each filter unit, designed to handle a washing rate of 16 gallons per square foot per minute. The wash water is stored in a cypress tank on the second floor of the plant, which has a capacity of 17,500 gallons.

The greater part of the building is two stories high, and reinforced concrete was used for the floor construction. The second floor is used for chemical storage, and contains the wash-water tank and chemical solution tanks. There are two cypress solution tanks for aluminum sulphate, discharging into either of two orifice boxes. One orifice box may be used to dose the raw water as it enters the first coagulating basin, and the other one may dose the settled water as it enters the second coagulating basin. A dry lime feeding machine on the first floor is fed from a hopper on the chemical floor, and in turn feeds the chemical into the first basin. It is electrically driven.

The high-service pumping equipment is completely revised for electrical operation. The city had on hand a 500-gallon-per-minute turbine pump, motor-driven, designed to pump against a head of 231 feet. This is to be used as a fire pump. A new 400-gallon-per-minute motor-driven turbine pump, operating against 200-foot head, was purchased for use as a service pump. Both pumps were installed on the pipe gallery floor of the new plant and draw from the clear well below. The water is sterilized by the application of chlorine into the pump suction.

The work also includes the rebuilding of the electric light plant. The old single-phase steam-driven generators were replaced by new oil-engine-driven units. These are 180-b.h.p. Diesel engines driving 150-kv.-amp., 2,300-volt, 60-cycle alternators. A new switchboard and new station wiring were required.

For One-Man Operation

It should be noted that the water and light plant is designed for one-man operation. The operator standing at one end of the filter operating floor will have in view the raw water as it enters the plant, the coagulating basins, the filters, the high-service pumps on the floor below, and the oil engines, alternators and switchboard in the engine room. The starters for both the high-service and low-service pumps will be within reach. The only part of the plant not visible from the one position is the low-service pumps in their pit 150 feet away.

The plant was designed and construction was supervised by Black & Veatch, consulting engineers, Kansas City, Mo. C. G. Bayles was resident engineer on the job. The dam, filter plant, and pipe lines were built by Alderson and Knox, of Perry. The filter equipment, filter piping, wash-water tank, and chemical equipment were furnished and installed by the Roberts Filter Company, of Darby, Pa. The Diesel engines were furnished and installed by the Busch Sulzer Bros.-Diesel Engine Company, and the pumps by the F. M. Beeson Machinery Company, of Kansas City.

Unusual Service of a Storm Drain

How a Corrugated Iron Drain Carried Debris and Heavy Boulders in Pomona, Calif.

By Carence E. Bayley
City Engineer of Pomona, California

ONE of the municipal improvements of which the city of Pomona, Calif., feels proud is the 4-foot corrugated storm drain which was installed in 1915. This drain consisted of 581 feet of 14-gauge Armco ingot iron corrugated pipe and included seven elbows.

As it turned out, the drain was installed in the nick of time, for, on January 16, 1916, Pomona and vicinity was visited by a storm which for destructiveness was perhaps the worst in the city's history. Bridges and culverts were washed out right and left, as well as long stretches of paved highway. Very extensive damage was done, the storm waters undermining and ruining many structures which had been placed with reasonable expectations of permanence.

It did one's heart good, however, to see how the new corrugated storm drain stood up and did its work. By its successful operation thousands of dollars worth of property was saved which would otherwise have gone down to destruction.

The aspect of the matter which made the greatest impression on the author's mind was the absence of any noticeable damage from the rocks, gravel and débris which the flood waters carried through the corrugated pipe. An automobilist who was caught in the flood states that he was driving down the road at twenty-five miles per hour, during the storm, and the trash carried by the ditch into which the pipe empties was traveling as fast as was his car. The pipe was installed at a grade of about two per cent, and with the débris being carried through at such speed, it certainly underwent a service test. All sorts of material went through the pipe, including some boulders which were nearly a foot in diameter. These came bounding through, making the curves and all, and apparently never damaged the pipe in the least.

To-day the drain, after four and a half years of service, seems to be practically as good as new.

ACKNOWLEDGMENT.—Illustrations courtesy *The Highway Magazine*.

TWO VIEWS OF THE STORM DRAIN THAT WITHSTOOD THE RAVAGES OF POMONA'S WORST STORM

Standard Schedule for Grading Cities and Towns for Fire Insurance

Part II

With Reference to Their Fire Defences and Physical Conditions

By John S. Caldwell

Engineer, New England Insurance Exchange, Boston, Mass.

EDITORIAL NOTE.—*The first instalment of this article, appearing in the January issue, outlined the application of the Standard Schedule and discussed in part the place of water-supply. This portion concludes the discussion of the water-supply and takes up the fire department. The concluding portion will complete the fire department analysis and take up fire alarm, police, building laws, hazards and structural conditions.*

IN considering the minor distributors and gridiron system, 6-inch is considered the minimum size satisfactory for hydrant supply in residential districts to be closely gridironed with 6-inch cross-connecting mains at intervals not exceeding 600 feet; or where initial pressures are high, a satisfactory gridiron may be obtained by a liberal per cent of larger mains cross-connecting the 6-inch at greater intervals; in new construction, 8-inch should be used where dead ends and poor gridironing are likely to exist for some time, and 6-inch only where blocks are 600 feet or less in length; in high-value districts the minimum size to be 8-inch with cross-connecting mains at distances as given above; 12-inch and larger mains to be on the principal streets and for all long lines not cross-connected at frequent intervals.

The mains of the distribution system should be of satisfactory quality and properly tested for soundness and tightness of joints. The use of cast iron pipe under pressure double that specified for the class is considered as introducing an unreliable feature, particularly where pressures are raised for fires; tests before back-filling the trench and service records of several years may, however, be assumed as offsetting this defect in part.

Electrolysis conditions should be studied and methods of prevention applied.

The distribution system should be equipped with a sufficient number of gate valves, so located that no single case of accident, breakage or repair to the pipe system, exclusive of arteries, will necessitate the shutting from service a length of pipe greater than 500 feet in high-value districts, or greater than 800 feet in other sections, and will not result in shutting down an artery; all valves to be inspected yearly and large valves more frequently, and be kept in good condition. The presence of some valves operating in opposite directions is to be considered the equivalent of unsatisfactory condition, ranging from fair to poor, depending on the number and importance.

In considering hydrant distribution it is readily apparent that proper distribution depends first upon whether the system is on a direct hydrant or engine stream basis, realizing, of course, that wider distribution could be permissible where engines were ordinarily used than where hydrant stresses were utilized, also that the fire flow required for the district is a determining factor, as the same distribution cannot be expected in a residential district as would exist in a manufacturing or mercantile section. The required fire flow is determined and the following table used:

ENGINE STREAMS

Fire Flow Required, Gallons Per Minute	Average Area Per Hydrant Square Feet
1,000	120,000
2,000	110,000
3,000	100,000
4,000	90,000
5,000	85,000
6,000	80,000
7,000	70,000
8,000	60,000
9,000	55,000
10,000	48,000
11,000	48,000
12,000	40,000

DIRECT HYDRANT STREAMS	
1,000	100,000
1,500	90,000
2,000	85,000
2,500	78,000
3,000	70,000
4,000	55,000
5,000 and over	40,000

Hydrants should be inspected in the spring and fall of each year, after use at fires during freezing weather, and daily in high-value districts during protracted periods of severe cold.

The standard requirements for hydrants specify that they should be able to deliver 600 g. p. m. with a loss of not more than 2½ pounds in the hydrant and a total loss of not more than 5 pounds between the street main and hydrant outlet; they should have not less than two 2½-inch outlets and also a large suction outlet where engine service is necessary. They should also be of such a design that when the hydrant barrel is broken off the hydrant will remain closed. Street connection should be not less than 6-inch in diameter and should be gated. Flush hydrants requiring chucks to be screwed on are considered undesirable, especially in sections of the country subject to heavy snow-storms, because of delay in getting into operation.

Fire Department

The subjects considered under the fire department are as follows:

1. Number of Officers
2. Number of Operators
3. Qualifications of Chief Officers
4. Tenure of Office of Chief
5. Appointment and Tenure of Office of Officers
6. Enlistment Requirements
7. Retirement Requirements
8. Number of Hose or Engine Companies (Apparatus)
9. Number of Ladder Companies (Apparatus)
10. Distribution of Companies
11. Total Required Manual Strength of Department
12. Manual Strength of Existing Companies in the High-Value District Considered
13. Engine Capacity
14. Reserve Engines
15. Condition of Engines and Hose Wagons
16. Fire-Boats
17. Powerful Stream Appliances
18. Chemical Equipment
19. Reserve Hose Wagons
20. Amount of Hose
21. Hose Larger than 2½-inch
22. Condition of Hose
23. Minor Equipment
24. Fuel
25. Repair Facilities
26. Horses
27. Suitability of Fire Stations
28. Discipline
29. Drills and Training
30. Responding to Alarms
31. Fire Methods
32. Conditions Affecting Fire Department Operations
33. Building Inspections
34. Records of Fires, etc.

In considering the number of officers the Schedule requires that there should be a chief and an assistant or deputy chief for over two and up to twelve companies, and another assistant, battalion or district chief to each additional eight companies. There should be two officers to each engine, hose or ladder company; a captain and two lieutenants may be considered sufficient for a combined company. Call officers—that is, officers who receive some pay for services but who do not devote their entire time to fire department duty—and volunteer officers are considered as equivalent to one-half full-paid officers.

There should be a sufficient number of competent operators—that is, engineers, stokers and chauffeurs—so that one will be on duty at all times for each engine or motor-driven apparatus.

Chief officers should be experienced in fire service and a chief should hold office for an indefinite term and be removable only for cause after public trial. Officers' appointments and promotions should be based on examination, seniority and record, under civil service rules with tenure-of-office provisions. Privates' enlistment should be under civil service rules and based on physical and mental examination with satisfactory age, weight and height limits, permanency to be only after a satisfactory probation period of six months, special training and examinations being required for engineers and chauffeurs. Full-paid members should be retired at the age of 62 unless unusually efficient at that time; proper and ample means should be provided for pensioning men for long service or disability.

The amount of apparatus in service and regularly responding to alarms should be sufficient to properly protect the city and should be on the basis of companies required, it being assumed that each hose company will be provided with a hose-carrying vehicle and that in cities of over 100,000 population one-half the engine companies required for first-alarm response in high-value districts will be provided with a steam or automobile fire engine and a separate hose wagon; other engine companies may each have only a combined pump and hose wagon assigned to it.

Every properly equipped piece of apparatus regularly responding to alarms should be considered as a separate company,

whether so organized or not, except that to be considered as an engine company it must have an accompanying hose wagon or carry hose on the pumping equipment. Apparatus may be hand-, horse- or motor-drawn, and where 80 per cent of the apparatus is motorized the formula for automobile companies may be used.

FORMULA FOR NUMBER OF COMPANIES

P = Population in thousands for cities or towns under 50,000

Number of Engine or Hose Companies
1.0 + 0.14 P for Horse-drawn
0.85 + 0.12 P for Automobile
For cities 50,000 to 200,000
4 + 0.08 P for Horse-drawn
3.4 + 0.07 P for Automobile

For cities having a population in excess of 200,000, the number of engine or hose companies depends on the distribution and on the ability to handle two simultaneous fires without leaving all other sections of the city unprotected.

In certain cities a number in excess of the above will be required, depending on the structural conditions found in the city. Where the topography and general layout of the city require for proper distribution a greater number of companies than determined by the formula, the deficiency is applied under the item of distribution of companies.

In cities almost solely residential in character, such as suburbs in metropolitan districts, or where the city has small local high-value centers needing less protection than the formula for companies calls for, the estimate will be based on the population corresponding to the fire flow believed necessary, except that where such cities have congested shingle-roof frame districts, at least two additional companies must be provided to protect the city in case of a second fire.

The number of companies in service should be assumed as increased by companies available as outside aid, where, by regular assignment, the response of such companies is provided for to the district considered or to fill in; such increase to be on the basis of one outside company equalling one-half a company in service, but not to exceed a total increase in excess of one-third the total number of companies required. Where adequate provision is not made for mutual aid from outside aid companies, the full number of companies available within thirty minutes should be allowed as a credit equal to one-third the points which this number decreases the deficiency in actual companies.

NUMBER OF LADDER COMPANIES

In localities having five buildings three stories or higher there should be one ladder company; in places over 20,000 population the number of ladder companies should equal 1 + 0.03 P; over 200,000 population the number of companies will depend on distribution. Where no ladder company is required, application should be made on the basis of deficiency in ladder equipment on other apparatus.

An aerial ladder must be provided in a district where five buildings are four stories or higher, and one ladder truck in five shall be of the aerial type.

In general, the distribution of companies should be such as to provide an engine or hose company within the following distances of every point in a district measured by the most direct route:

DISTRIBUTION TABLE

	Horse-drawn		Automobile	
District	Engine or Hose	Ladder	Engine or Hose	Ladder
Merc'l or Mfg..	½-mile	¾-mile	¾-mile	1 mile
Closely built res.	1 mile	1½ miles	1½ miles	2 miles

Strength of companies should be maintained as follows:

	Least Number of Men on Duty, Continuous Duty or Two-Platoon Systems	
Companies	Day Time	Night Time
Within or Near High-Value Dists.		
Engine Company	7	9
Ladder Company	7	9
Hose Company	5	7
Water Tower Company	1	1
Other Districts		
Engine Company	5	7
Ladder Company	5	7
Hose Company	3	5

There are many modifying features to the above table, such as motor pumpers, drivers not performing fire duty, auxiliary squad, aerial ladder companies, etc., which would necessitate additional or less men per company than the table calls for.

In departments having call or volunteer members, with tappers in houses and places of business or sufficient tower bells, horns or whistles, four call or eight volunteer members may be considered as equivalent to one full-paid member, up to one-third the least number required to be on duty at all times. Volunteer members receiving pay for fire service shall be considered on call basis. Call or volunteer members sleeping at fire stations may be considered as the equivalent of full-paid men in estimating the night strength. With the two-platoon system, if proper arrangements are not made for the response of men on off-shift for large fires, the least number of men on duty as given in the above table shall be increased one-fourth. For outside aid companies regularly assigned in the running card and assumed as equivalent to companies in service, one-half the combined least

number of men on duty will be allowed. For outside aid companies available within 30 minutes but not regularly assigned, the actual least number of men will be allowed up to one-third the points which the combined least number of men on duty in these companies reduce the deficiency in men.

In considering engine capacity where the domestic water-supply cannot deliver at direct hydrant stream pressure a quantity in excess of the fire engine capacity in service plus one-third the required fire flow, there should be provided a total pumping capacity equal to two-thirds the required fire flow.

In cities of over 200,000 population and requiring fire flow for two simultaneous fires, engine capacity must be provided equal to two-thirds the total fire flow required for the district.

In cities where the fire flow required in the high-value district is less than that corresponding to the population but there is a residential district of large extent and high conflagration hazard, the engine capacity required shall be on the basis of a fire flow of 2,000 gallons in addition to the amount necessary to protect the high-value district, to provide protection for a simultaneous second fire.

Where fire streams are available, in the district considered, from a high-pressure fire system, its capacity shall be considered as engine capacity, except that if residual pressures are less than 250 pounds, actual engine capacity should still be provided.

In estimating engine capacity, reserve engines or engines from outside localities for which a regular assignment is made, they are to be considered at one-half actual capacity but not to exceed one-third the total engine capacity required. When provision is not made for mutual aid, the full engine capacity available within 30 minutes shall be allowed as a credit up to one-third the points which this capacity decreased the deficiency; capacity of engines to be that obtained at tests. Where no test capacity is available, no engine is to be considered at more than 80 per cent of its rated capacity, and no engine in excess of 1,000 gallons capacity.

In districts having a domestic water-supply capable of delivering at a residual pressure permitting direct hydrant streams a fire flow in all parts of the district in excess of the engine capacity available plus one-third the required fire flow, application shall be made under "Adequacy of Water-Supply" and no deficiency applied for engine capacity, except that where buildings are four stories or higher some engine capacity, depending upon the pressures at which direct hydrant streams are available, may still be required.

Engines should be kept in good condition; the absence of annual tests and tests after repairs, in accordance with the National Board of Fire Underwriters' rules for testing, may be considered a deficiency. Hose wagons should be in good condition and of sufficient strength for the service and weight to be carried, and if automobile, should have motor of good capacity and in good condition. A fire-boat should be required where there is an occupied wharf frontage of one mile, and additional boats such as to give a proportion of one to each three miles of wharf frontage; total fire-boat capacity to be equal to one-half the required fire flow for the district protected. For privately owned fire-boats or tugboats with fire pumps and turrets, if operating only in the harbor and if arrangements are made for their regular response to water-front alarms and for their operation under the chief of the fire department, credit would be allowed equal to one-half the points which such boats decrease the deficiency in municipally owned fire-boats. If such boats are not regularly tested, this credit shall equal only one-third the points.

Suitable appliances should be provided for handling powerful streams, except where less than 1,000 gallons of water is available as direct hydrant streams or from fire engines, or where not more than five buildings in the high-value district considered are three stories or higher, these should include turret or monitor nozzles, siamese connections, deluge sets and cellar pipes, properly distributed. A water-tower or ladder pipe should be provided where five buildings are four stories or higher; water-towers are required in high-value districts having over ten buildings six stories and higher, such that one will be within 1½ miles of every building six stories high.

Each piece of apparatus carrying hose or ladders should have two 2½-gallon extinguishers; and sufficient apparatus, either chemical engines, combination hose wagons or ladder trucks, should carry 35-gallon or larger chemical tanks to enable two pieces so equipped to respond to each first alarm.

Water-tanks operated in conjunction with booster pumps or compressed air or gas are considered the equivalent of chemical tanks. Companies carrying 150 feet of small hose for use on 2½-inch water lines are considered as one-half value of chemically equipped apparatus. Where static hydrant pressures are less than 60 pounds, allowance of one-half credit is made for chemical tanks on pumping engines.

There should be maintained in reserve at least one hose wagon for each twelve, or fraction thereof, steamers in service, or eight, or fraction thereof, automobiles. One or more reserve hose wagons should be loaded with at least 1,000 feet of hose, preferably 3-inch. Where more hose wagons are in service than called for, a reserve loaded wagon is not required.

Each engine or hose company should carry at least 1,000 feet of 2½-inch hose or larger and be provided with a complete spare shift; hose on reserve wagons may be considered as spare hose where two or less hose companies are required. For cities of less than 50,000 population, if more companies are provided than called for, the total amount of hose carried by all apparatus, divided by the required number of companies, would be considered as the average amount carried per company.

For hose companies responding to first and second alarms in mercantile or manufacturing districts where direct hydrant streams are used, at least half the hose carried on wagons should be 2¾-inch or 3-inch; if engines are used, and in all other districts, at least 200 feet of large hose should be carried on each wagon; large hose not to be required where less than 1,000 gallons of water are available as direct hydrant streams or from engines, or where not more than five buildings in the high-value district considered are three stories or higher.

Hose should be in good condition; a service of seven years should be expected before being in such condition as to require discarding; hose not over five years old should be used in important companies, and if not regularly tested such hose should be considered as in poor condition.

Complete minor equipment should be provided for each company, this to include shut-off nozzles from ¾-inch to 1¼-inch, and open smooth-bore nozzles from 1⅛-inch to 1½-inch, short ladders, portable extinguishers, salvage appliances, including water-proof covers and sufficient small equipment to enable the firemen to perform their work with the greatest facility and despatch.

Good-quality quick-steaming coal, and gasoline where automobiles are used, should be provided in sufficient quantities at convenient points and ready for quick handling.

Adequate and preferably department facilities for making ordinary repairs in any municipality, and major repairs in cities over 50,000 population, should be provided.

It is particularly desirable to have equipment standardized, such as wheels, poles, all hose couplings, playpipes, tips and minor equipment. Spare parts, fittings, tools, poles, wheels and tires should be kept on hand.

Suitable horses for horse-drawn equipment should be provided for all apparatus necessary for the required number of companies, reserve horses to be provided, equal to 5 per cent of the number in service, but not less than two horses when over six pieces of apparatus are in service. If hired horses are used or if horses are used for other than fire department purposes, they are to be considered as 50 per cent deficient.

Fire stations should be adapted for the service as applying to ease and quickness of response; each engine or hose company should have hose-drying facilities and engine heaters provided for steamers depended upon for first streams.

Provisions should be made in complete printed regulations for control of the department and authority given the chief to enforce them, subject to review or confirmation by the supervising body or the civil service commission. Discipline should be rigidly maintained and fines and suspensions impartially imposed and sustained.

Drills in charge of a competent officer should be regularly held at a drill tower, for all company members of the department. Drills should be classed as deficient if any for newly enlisted men, or if no drill tower is provided.

(To be concluded in the March issue)

MC BRIDE PARK, ISLAND OF KAUAI, H. I.

A County Park in Hawaii, to Be Maintained by the Life Insurance of the Giver

McBRIDE Park is situated in the Hawaiian Islands on the Island of Kauai. It occupies the crest of one of the low foothills overlooking the sea, with a fine view upon fertile valleys, cane fields, and back to the high mountains. The hillsides are covered with pineapples, and the lower reaches with sugar cane, but the top has been planted with a splendid forest of eucalyptus and pine trees. Ornamental shrubs and trees, beautiful flowering beds, fountains, and some fine statuary decorate the park, which occupies about 100 acres.

It was built as a private park by Mr. McBride, and is in the open country, ten or fifteen miles from a town of any size, and with no American residences within a mile or more. Mr. McBride made this park himself and maintained it for the first few years. He then had his life insured for $60,000 with the provision that at his death this $60,000 should go to the maintaining of the park. After carrying it for a few years, he turned it over to the County Commissioners of the Island of Kauai with the understanding that the commissioners were to keep up the life insurance and at his death they were to have the park as a county park with the $60,000 life insurance for maintenance. This is believed to be one of the most unique methods of maintaining a public park that have been attempted.

Provision for Playgrounds in New Suburban Sections

A Kansas City bank president suggests that local laws should provide that in every new suburban section opened near any city there shall be one or more squares or blocks of land set aside permanently for playground and recreational activities. This, he feels, will increase the value of surrounding property and thus provide ample compensation for the real estate owners who develop the new area. It will also help to provide opportunities for healthful, wholesome neighborly activities, for play and recreation, for community organization, and for such joyous neighborliness as American communities sadly lack and greatly need.—*The Playground.*

Forward Steps
Reported to THE AMERICAN CITY by Municipal Officials & Department Heads

City Engineers

Good Roads for Westerly

WESTERLY, R. I.—Because Westerly is located on the Rhode Island-Connecticut state line, it will have added to its already good system of improved roads more than 25 miles of state highway by next summer.

The state of Connecticut is just completing 18 miles of bituminous construction from Norwich, Conn., to Westerly, through one of the wildest and most picturesque sections of eastern Connecticut. Poor roads and a rugged country have been responsible for a sparse population in this region. The road makes a direct route to the shore resorts of southern Rhode Island—Watch Hill, Narragansett Pier and Newport—from Hartford, Conn., and the Connecticut River valley to the north of Massachusetts.

Early in December this road was practically graded, and it is now open to traffic. The seal coat of bituminous construction yet remains to be completed. The tar is on the ground, and the work will probably be finished by summer. The continuation of this road through Westerly along the shore towards Narragansett Pier is being constructed by the state of Rhode Island. Eight miles are practically finished, and the remaining gap of ten miles between the Westerly section and the section built a year ago at Wakefield has been contracted for.

Westerly is installing a sewerage system, but because of labor conditions progress has been very slow. The problem facing the Highway Commission is the reconstruction of nearly 7 miles of highways, where the sewers are being installed. They expect to secure the services of a trained highway engineer, not only for this work but to take care of all the roads of the town in the future. With the rebuilding of its roads after the damage caused by the installation of the sewerage system, Westerly expects to have more and better roads than any other town in the state.

THOMAS McKENZIE,
City Engineer.

Mayors

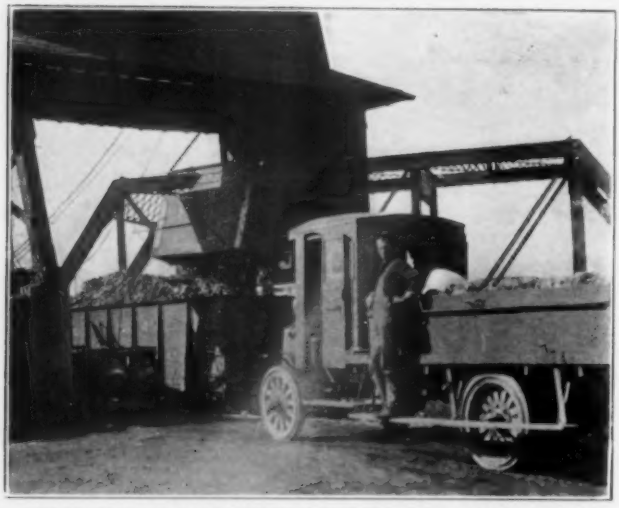
Municipal Handling of Garbage

GRAND RAPIDS, MICH.—This city owns and operates its garbage collection system, and very satisfactory results have been obtained under this plan.

In collecting the garbage, both wagons and motors are used, the vehicles being fitted with large covered tanks. The garbage collectors carry with them steel baskets into which they empty the garbage at each residence, and from which the refuse is dumped into the steel tanks on the trucks.

Each property owner or tenant who wants the garbage collection service is required to pay for his own garbage can. Collections are made regularly once a week in winter and twice a week in summer. The garbage must not be mixed with paper, cans, or ashes; such rubbish is disposed of by the individual property owner. The garbage is sold under contract to the American Stock Food Company located at Sullivan, Mich., about twenty miles from this city. When collected, it is loaded on cars at a central loading station, and shipped to that point, where it is fed to hogs.

The broad idea in handling the garbage municipally is that it discourages people from burying it, burning it, or otherwise disposing of it in an unsanitary manner. The cost to the property owner for the collection of his garbage averages about $1.24 a year.



THESE TRUCKS ARE EASILY EMPTIED INTO GONDOLA CARS

The accompanying illustration shows the municipal trucks discharging their contents into a gondola car for shipment. The city has in operation two 3½-ton and one 2½-ton United trucks. They are driven alongside the car, and by a simple but ingenious arrangement the steel bodies are mechanically lifted over the open car and their contents dumped.

JOHN McNABB,
Mayor.

Recreation Departments

Winter Sports Promoted

MINNEAPOLIS, MINN.—The city of Minneapolis, climatically, is ideally situated for the carrying-on of all outdoor winter sports. Plenty of ice and snow can usually be depended upon during the season, which is about two months' duration. Good use is made of all the facilities. The estimated attendance at park rinks during the season of 1920 was approximately 1,000,000.

That the people of our city may enjoy the greatest of all winter sports—skating, 23 rinks are maintained and are located so that a rink is available within walking distance of any part of the city. Each rink is well lighted, and the ice is kept in as good condition as is possible in an outdoor rink. Warming-houses are provided at all rinks, where wraps may be checked and skates rented.

In connection with the rinks for general skating, five hockey rinks are maintained. Hockey became such a popular sport, and so many teams were organized and wished to play, that it was found necessary to light the rinks, so as to make evening play possible.

The following is a brief description of the lighting system used:

Size of rink	176 x 70 feet
Lighted area	200 x 80 feet

Sixteen 500-watt lights, with white enameled steel reflectors, which total 8,000 watts.

The lights are suspended from two cables, 18 feet from the ice, eight to a cable, each eight 25 feet apart.

The distance between cables is 40 feet.

A system of this arrangement gives a light which is equal to sunlight for playing purposes.

A formal program of winter activities is promoted, which has proved very popular.

Hockey in Minneapolis has reached a stage where it is the most entertaining and biggest attraction of the outdoor winter

A SKATING RINK IS WITHIN WALKING DISTANCE OF ANY PART OF MINNEAPOLIS

sports. The season of 1919-1920 saw twenty-four teams, divided into three leagues (Senior, Junior No. 1, and Junior No. 2) playing in the municipal leagues. The leagues had a wonderfully successful season, and all their games were attended by large crowds, who greatly appreciated the fine brand of hockey furnished by the players.

Skiing has long been a popular sport in Minneapolis, but as carried on by private organization it did not offer much opportunity for any one but the expert. During the latter part of the winter season of 1920, a Municipal Ski Club was organized. It met with immediate success. Three tournaments were held, with 88 participants, and approximately 3,000 spectators were present. The program of events included jumps of various descriptions, and embraced Senior, Open, Novice, and Boys' and Junior classes. With the increased interest shown this season, the club expects to make use of two slides, one for novices and one for experts.

The Municipal Hiking Club, whose members hike the year around, plan on organizing a Cross-Country Ski Club. This is a phase of the sport that everyone can indulge in and enjoy.

The Norwegian American Skating Club, an organization of this city, with an aim to advancing skating contests, fancy skating, and skating as a recreational measure, affiliated itself with this department last year, and under the organization of the Municipal Skating Club, a number of interesting meets were held. Each year a series of five skating meets are run for the boys. The city is divided into four sections where races are held for the boys living in those districts, respectively. The contestants placing first, second and third in these sectional meets, skate at a central rink to decide the city championship. No previous registration is necessary, the only restriction being residence in the district where the meet is held. The boys are divided into three classes according to height, namely: 5 feet 3 inches and under; 5 feet and under; 4 feet 9 inches and under. The events were: 50-yard dash; 100-yard dash, and 220-yard dash.

A great deal of interest in coasting and tobogganing is shown each year. Three natural hills are maintained to accommodate the large number of enthusiasts in this branch of outdoor activitiy. The hills are well illuminated, and every afternoon and evening a great number of people take advantage of this opportunity.

K. B. RAYMOND,
Supervisor of Recreation.

Health Departments

An Active Health Center

GLOVERSVILLE, N. Y.—The public health work of Gloversville is carried on from a central building. This consists of two floors, on the first of which are located the offices of the Health Officer and Registrar, plumbing and sanitary inspectors, and the Clerk, and the conference room of the city Board of Health, also the distributing sta-

THE GLOVERSVILLE HEALTH CENTER

tion for the county laboratory supplies and antitoxins. These offices are well equipped and centrally located.

All vital statistics are kept in the Registrar's office for public reference. All the communicable diseases are reported to the Health Officer, who sends out a nurse to investigate the cases, and make reports on the housing conditions, family history, sources of infections, instructions to families isolated, etc. A report of all these diseases is filed monthly with the Board of Health.

The plumbing inspector investigates all new plumbing work, to make sure that the fittings are standard and that there are no leaks; also that all regulations are complied with. He issues plumbing licenses and looks after all complaints of defective plumbing and sewer connections.

The sanitary inspector attends to the complaints of public nuisances and any other matters of interest to the public health, by regular weekly inspections.

The Health Center accommodates the county distributing station for laboratory supplies and antitoxins. This is of great assistance in case of epidemics, because of the time saved by not having to send to the state, and in winter a great amount of trouble from freezing and from slow transportation will be eliminated. This station is in charge of the city technician, who has certain hours for the distribution of supplies. The city laboratory is located in the hospital building, which is apart from the Health Center. The laboratory work is of a diagnostic type for the most part, and is under the direct supervision of the city bacteriologist. Reports from this division of the public health work are sent to the state department monthly.

The meat and dairy inspector scores the dairies and approves the milk brought into the city for sale. He inspects the markets and other places where food is sold.

On the second floor are the two clinics, one for the tuberculosis work of the city and the other for the venereal work. Each clinic has a public health nurse on duty. The tuberculosis nurse investigates any suspected cases reported by the doctors, to see that the patient is properly attended, that he is isolated from the rest of the family, that his food is correct, and whether the case should be transferred to a sanitarium. This nurse does the diphtheria culture work for the city. The cultures are taken and sent into the laboratory for examination and then reported to the Health Officer.

The venereal clinic is very well equipped with all the necessary apparatus for carrying on the work properly. A physician is in charge of the public clinics held twice each week, at which time new patients are examined and treatments are given. The nurse investigates new cases and does general social follow-up work. Outside of the clinic hours her duties are to look up the family histories, locate the source of infection if possible, look up the patients who are negligent about their treatments, and give instructions as to the care of the patient in the home. Blood Wassermanns are taken at the clinic, but are sent into the state laboratory for examination. This clinic occupies two large rooms, one a consulting-room, the other a waiting-room.

A. L. JOHNSON, M. D.,
Health Officer.

Forward Steps Gathered Here & There

Schools Aid in Fire Prevention Campaign

Texas is making effective use of the public schools in its fire prevention campaign. Fire prevention education is a fire cure. The fire waste in lives and property in this country is appalling. It is believed that instruction, especially to the young in the schools, will greatly reduce this vast fire waste. Therefore, the State Fire Commission, which under the laws of the state of Texas makes rates, has passed a resolution granting a credit of 3 per cent on their key rates to such cities and towns as teach fire prevention in their schools. This course of instruction is not onerous; it occupies but little

of the time of the pupils of the schools, and calls for but one or two simple text-books. This proposal has met with quick approval by mayors and school superintendents in Texas.

The school program laid down by the State Fire Marshal follows:

"In the third and fifth grades one period each week, of from fifteen to thirty minutes, must be given to the study of fire prevention. This period must be named 'Fire Prevention' on the daily program. The book to be used is 'Safeguarding the Home Against Fire.' In the third grade this book shall be in the hands of the teacher; in the fifth grade it shall be in the hands of the pupils.

"In the sixth and seventh grades one theme each term must be written on fire prevention. In the High School one theme each term must be written on fire prevention.

"The work in the third and fifth grades, aside from the use of the above-named book, may consist of written or oral stories along fire prevention lines; the discussion and reports of large conflagrations, both state and national; the discussion and reports of fire hazards, and particularly local hazards and conditions. 'Uncle Jim, the Fire Chief,' an adopted state text-book in the supplementary reading course of the intermediate grades, might well be used in this course.

"The work in the sixth and seventh grades, of one theme each term, should consist of the study of the large conflagrations; a study of the child's own home and its hazards; a study of the protection against and the removal of his own home hazards; a study of similar school conditions; a study of the modern means of fire protection; a study of the ways of turning in a fire alarm.

"The work in the high school, of one theme each term, should consist of the study of the great conflagrations of history; a study of the fire department of the city; a study of fire hazards in the student's own home and school; a study of the best use for civic progress to which the preventable fire waste might be applied; a study of the progress of fire prevention in the past ten years.

"The theme work in the high school and the sixth and seventh grades might well be done during the months of October and April."

A. P. WOOLDRIDGE,
State Fire Marshal.

City Planning in Buffalo

BUFFALO, N. Y.—The Council of Buffalo, consisting of five Commissioners, including the Mayor, has been operating under the commission form of government since January 1, 1916, and the many details connected with the location of garages, laundries, industries, etc., demanded so much attention that the need of zoning regulations was soon apparent. Consequently, about two years ago a City Planning Committee of six city officials (heads of bureaus) was appointed to devise a comprehensive planning and zoning system for the city of Buffalo and to report to the Council.

The committee was instructed to prepare a zoning system first, but the necessity for a new municipal building became so pronounced that the matter of a civic center forced itself for consideration, and no little time and study have been given this matter concurrently with the study of the zoning problem. It is hoped soon to present some definite zoning regulations.

In the studies made, due attention was given the danger of super-centralization in a large, growing city like Buffalo. Subcenters were considered highly advisable for the grouping of minor units. Three city planning experts were consulted upon this matter in an advisory capacity, and a report favoring the policy of a civic center was made by the committee to the Council. The Council, however, deemed it advisable to submit the question of desire for a civic center to a vote of the people at the November general election.

Meanwhile the Buffalo City Planning Association was formed, representing over 100 different organizations with a membership of over 30,000, for the purpose of cooperating with the City Planning Committee and of educating the public in the principles of city planning.

This association did a wonderful work in the matter of publicity. Talks and stereopticon lectures were given before many organizations, clubs and societies at noon, afternoon and night, whenever the opportunity presented. The women were of great service in the cause.

The vote was 42,000 in favor with 30,000 against, and considering the unfavorable conditions—strong newspaper opposition, many other public questions claiming interest and possible large expenditures, and a stormy election day—it is deemed a notable victory—one reflecting the strong civic spirit that prevails in Buffalo, and it is hoped that this article may be helpful to other cities, even as a previous article published in THE AMERICAN CITY on Milwaukee's similar victory last April was helpful to Buffalo.

HARRY J. MARCH,
Executive and Engineer, City Planning Committee.

A New City Office

Sacramento, Calif.—Sacramento has added to its staff of municipal officers a City Landscape Architect. Realizing that unless such an office were kept entirely free from political control it would have no attraction for the type of man the city wanted to fill it, the position has been made appointive and not elective.

The duties of the City Landscape Architect include most of the functions ordinarily expected of the visiting consultant, along lines of city planning and of general landscape architecture. In addition to these duties, he must, in connection with the park board, take general charge of planting within the city. Sacramento has a wise ruling which forbids the moving, planting or trimming of street trees without the consent of the park board. The Landscape Architect is to have charge of this work also, together with the park board.

The position has been recently filled for the first time by the appointment of Frederick Noble Evans. Mr. Evans comes to California from the University of Illinois, where he has been in charge of the professional school of landscape gardening, lecturing also to the classes in city planning. Some time ago Dr. John Nolen prepared a most valuable report on the parks of Sacramento. This report and the plans which accompany it will be followed as far as possible in the working out of the park system for the city. In cities where city landscape architects are permanently employed, the consultant will have the advantage of having the ground prepared for his suggestions, and of an intelligent and competent support in working out the plans.

There is little doubt that the time will come when most cities of size will create such an office, for the reason that it brings together certain functions of city administration too often separated. The person who fills the office should be able to administer the affairs of the parks both from the business and from the creative side, and should be sufficiently trained in the principles of city planning to work toward the coördination of all branches of city activity, such as traffic, zoning, districting, selection of building sites, etc. Most of all, he must have an interest in the individual lot owner and make him realize his civic responsibility.

LUCY LOWE.

The Problem of Unemployment

IN a statement by the American Association for Labor Legislation, a number of valuable suggestions are made for communities now facing problems of serious unemployment. A part of the report follows:

"The appointment of an unemployment committee by the mayor, if improper political influence is guarded against, insures semi-official standing and greater prestige. Membership should include all classes concerned, such as employers, workingmen, public officials, social workers, civic leaders, and representatives of churches, lodges and women's clubs. To carry out preventive measures, permanent organization rather than temporary activity during the crisis is essential. Educational work, based upon careful information gathered from employment offices, relief agencies and all other available sources, should be undertaken in order to bring the facts of the unemployment situation home to every citizen, with emphasis upon civic and industrial responsibility.

"Start or push forward special public work, using private contributions in time of urgent need if public funds cannot be obtained. This should not be "made" or unnecessary work, but needed public improvements in as great variety as possible, so as to furnish employment to other sorts of persons besides unskilled laborers. Give preference to resident heads of families if there is not enough work for all applicants. Employ for the usual hours and wages, but rotate employment by periods of not less than three days. Supervise the work carefully. To avoid the difficulties of emergency action, make systematic plans for the regular concentration of public work in dull years and seasons, by special provisions in the tax levy, or by other appropriate method. Urge the repeal of laws restricting cities to contract work. Secure the aid of state and national officials in stimulating local action. Steady the employment of the regular force, retaining employes on part time in preference to reducing their numbers."

Bituminous Macadam Pavements in a New Jersey Town

By E. B. Lloyd
Town Superintendent, Montclair, N. J.

DURING the seasons of 1919 and 1920, the town of Montclair, N. J., carried out an extensive paving program, a small part of which consisted of the resurfacing of about five miles of streets with bituminous macadam built by the penetration method. All these streets were on more or less of a grade, and it was desired to have the surfaces left in such shape that there would be the least tendency towards skidding or slipping in wet weather. It was therefore decided to put on the bitumen in one application and to omit the seal coat for at least a year.

APPLYING THE BITUMINOUS BINDER, AND THE FINISHED ROAD IN MONTCLAIR, N. J.

In each case there was an old telford foundation upon which to build. After the old macadam surface had been removed and spread to serve both as gutter and shoulder, the telford was renewed where needed. Any further inadequacies which became apparent after rolling were made up with the old macadam, and the foundation was brought to an accurate grade. The depth of the wearing surface was made 3 inches after compression with a 10-ton roller, and consisted of stone passing a 2½-inch screen and retained upon a 1½-inch screen. This wearing surface was rolled until absolutely firm and until there was no movement under the roller, and was then given an application of asphalt at the rate of 1¾ gallons per square yard of surface. After the application of the binder coat, stone passing a ¾-inch screen and retained upon a ½-inch screen was spread on the surface to fill the voids, and the pavement was then well rolled. Before opening to traffic, the surface was given a second covering with the ½-inch stone, and enough was spread to leave a slight surplus after entirely filling the voids. Approximately five miles of streets were resurfaced in this manner during the season of 1919, the work extending from early May until late October.

In the spring of 1920 some defects appeared in the last-built roads, which could largely be accounted for by weather conditions at the time of construction. The earlier roads came through the severe winter without damage or the appearance of the slightest defects, and it was decided not to give these streets a seal coat until such time as it may be required in the future. After all defects had been corrected in the streets designated for sealing, the surfaces were carefully swept both by a mechanical sweeper and by hand, and a seal coat of ¾-gallon per square yard was applied, cov-

ered with the ½-inch stone, well rolled, and opened to traffic. Asphalt of the same penetration (90) as the binder course was used for the seal coat.

In addition to the slightly rough surface obtained as a result of this method of construction, the postponement of the seal coat for a year appears to be advantageous in that any defect in workmanship or material is sure to appear after the street is subjected to a winter's weather and traffic, and it can then be easily repaired before the seal coat is applied and the street is finally completed.

Street Lights to Advertise Charity Campaigns

A NEW and unique feature of the use of street lights for the advertising of a charity campaign was evolved and used in Schenectady, N. Y., to call attention to the Fourth Red Cross Roll Call, held during the first week of December, 1920. A large Geneva cross covered with red cheesecloth was placed on either side of each street-lighting globe along the main street. In order that there should be no diminution in the amount of light from the street-lighting standard, no cloth was placed on the sides toward the roadway and the sidewalk.

The idea of using the street lights in this manner was originated by W. D'A. Ryan, director of the Illuminating Engineering Laboratory of the General Electric Company. This is probably the first time that street lights have been used in such a manner, but it is believed that the idea will be copied by other cities when local or national drives or campaigns are being actively carried on.

The Geneva crosses, which were 4 feet wide and built of basswood, were firmly secured to the lighting poles by blocks at the bottom drawn together by 16-inch bolts. The framework with the cloth already on it was erected by carpenters from a tower wagon belonging to the street railway company. The fact that Schenectady went over the top for the first time in a Red Cross drive speaks well for the success of this advertising feature. Similar designs which are distinctive to certain local or national charitable organizations may well be featured in this way during all types of civic campaigns.

A UNIQUE FEATURE IN CHARITY CAMPAIGN ADVERTISING

New Segment Block Storm Sewer

An Outline of a Design of a Sewerage System on Flat Grade with Provisions for Extensions

By Frank LeCocq

City Engineer, Aberdeen, S. Dak.

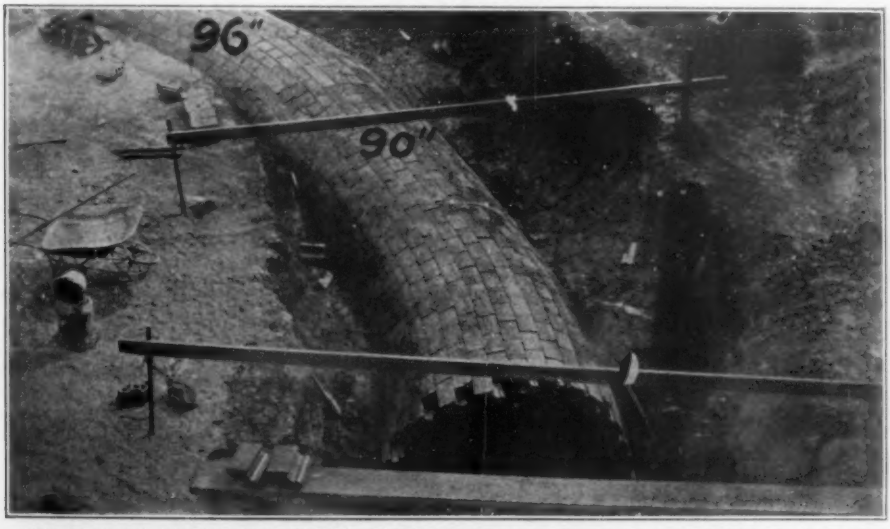
THE city of Aberdeen, S. Dak., located in the north central part of the state, has a population of about 16,000 and is steadily growing.

The territory within the city limits is about 2,000 acres. The general slope is from west to east and from north to south, extending towards Moccasin Creek, southeast of the city. The surface of practically the entire area within the city limits and the surrounding territory is extremely flat, varying not more than 10 feet in elevation, the extreme difference in elevation being 30 feet. The topography is characterized by a series of slight elevations and depressions, and a large drainage area enters the city from the northeast through a ravine. Moccasin Creek is very sluggish and acts simply as a storage reservoir for surface water. After traversing a large territory this creek empties into the James River. The Moccasin forms an irregular loop, over 50 miles in length, south of the city, and comes back within 7 miles southeast of the city. In this 50 miles there is only 13 feet of fall.

The Present Sewers

The city has two separate sewer systems. The sanitary sewers are used for building-connections only. All of the sanitary sewage has to be pumped. The present storm sewers are small in size, and the grades are very flat, making it difficult to keep the sewers clean, and they are very inefficient. During heavy rains large areas of the city are flooded and considerable damage is done.

About eight years ago a storm-sewer system was designed by a former city engineer. Plans were submitted for a complete storm-sewer system which was supposed to meet the future growth of the city. According to the plan the city would be traversed with fourteen small trunk lines ranging in size from 24- to 36-inch. All these outlets would be located east of the city along Moccasin



THE SECTION WHERE THE 90-INCH SEGMENT BLOCK SEWER IN ABERDEEN, S. DAK., IS ENLARGED TO 96 INCHES

Creek.

Two of these small trunk lines were built in 1914, making a total of four outlets at the present time. Each of these lines serves certain particular districts, and they are too small to provide for future extensions. After spending about $50,000 on these two small trunk lines, it was found that other lines would have to be put in immediately to serve territory where paving was being petitioned for. Several petitions for paving had been filed with the Board of Commissions, but had to be denied, as there were no storm sewers to serve these particular streets.

Investigations

The writer was instructed to make a careful study of the storm-sewer problem. It was found from the records that the average annual rainfall for Aberdeen is about 30 inches. A study of the rainfall records covering a period of about 25 years showed that out of 47 storms there were 7 storms in which the rainfall exceeded 1 inch per hour. There were 4 storms during which the rate was from ½- to 1 inch per hour, and the rate during the remaining 36 storms was less than ½-inch per hour. It was found that the storm sewer serving the business district of the city was entirely inadequate and had to be relieved. A large number of small 8- and 10-inch laterals were completely filled with mud. After a careful study it was concluded that a different system would have to be designed in order to take care of the present and future growth of the city.

Design of System

On June 16, 1919, the writer submitted complete plans and specifications for a storm-sewer system. This system is composed of a trunk line running north and south through the central part of the city. The outlet is southeast of the city limits and enters Moccasin Creek. All of the present east-and-west lines are intercepted by the trunk sewer; other laterals from 18 to 36 inches to be added in the future will enter the trunk line from the east and the west. The main trunk line is 2½ miles long, ranging in size from 96 to 60 inches.

This system resembles a symmetrically shaped tree with the main trunk line gradually growing smaller from the outlet up, and with branches spaced equally extending into outlying districts. The plans also provide for an open ditch 6 miles in length, extending southeasterly from the outlet and cutting off the 50-mile loop of Moccasin Creek. A fall of 13 feet would be obtained by the construction of this ditch, and the sewer outlet would be connected directly with the James River.

The system as designed will take care of about an inch of rain per hour. It was found that the cost of designing the system to provide for storms of the greatest intensity would be too great. The sewers have to be laid on very flat grades, and in order to provide for the maximum rainfall the sizes would be prohibitive. The only thing possible under these conditions was to utilize all the fall available, which is 2 feet to the mile, and to design such a system as is feasible in cost but which would take care of the drainage in a reasonable way and greatly improve present conditions. The main outlet will have a capacity, flowing full, of about 12,000 cubic feet per minute with a velocity of 3.7 feet per second.

The ultimate cost of this system will be much less than if the former plan was carried out, since the cost of large sewers per unit of carrying capacity is much less than for small sewers. With a central trunk line the materials can be easily and economically added from time to time as they become necessary.

The plans for this system were adopted by the city. The contract for the main trunk line was let on August 1, 1919, to J. J. Dunnegan, of Shenandoah, Iowa. The laying of all of the 96-inch and 90-inch pipe, 4,400 feet in length, has been completed this year. The sewers included in the contract will be finished in 1921. The cost of the work will be $325,000.

Material Used and Methods of Construction

The sewer is being built of segment block of the interlocking type. This block is manufactured by the Red Wing Sewer Pipe Company, of Red Wing, Minn. This type of block has just been placed on the market, and the Aberdeen job was the first on which the new block was used. The block is easily laid and has been satisfactory for this type of construction. It is not laid with cement joints, only a thin grout being used in the bottom and on top of the sewer after a section has been laid. Between the top and bottom sections of the forms, four jack screws are used for raising and lowering

the top part of the form. This type of form has proved to be of great value, as it is easily moved and put back in the proper position.

Several hundred feet of the 96-inch sewer had to be laid in quicksand. Progress was very slow, but the sewer was laid satisfactorily by placing a bed of gravel under it up to the quarter line.

When the work is completed, Aberdeen will have the foundation for an adequate system of drainage and will undoubtedly enter into an extensive paving program, which has so far been held up for lack of proper street drainage. Although the city is located in a swamp, it will nevertheless become a place where frog-ponds will be things of the past. When completed, it will mean more to this city than any other public improvement ever undertaken here.

Does It Pay to Clean City Streets in Winter?

Snow Removal Expedites Transportation and Saves the Road Surface

THE scene depicted below is a familiar one in cities where snow is not removed from business streets shortly after a storm has ceased. Can you imagine the damage incurred to a pavement when a dual rear wheel of a motor truck having four or five loose chains locked over it starts thrashing around like the one in the illustration? The chains strike a fearful blow on the snow and ice, and soon reach the pavement and continue the damaging work. Perhaps many engineers will think this is only an incident, but in a number of cities all but the very hardest pavements have been damaged to considerable extent in this manner. There is not only the street to be considered—think of the damage to the truck when as each chain strikes the pavement, the wheel is instantly and momentarily checked in its speed, thrusting a great additional torque on the axle. Transportation facilities in cities are greatly hindered by snow in the streets. Snow should not only be removed from the center of the roadway to permit a single or double line of traffic, but should be removed from near the curbs in order that traffic may have ample space to operate and manoeuver.

The various methods of snow removal which have been developed within the last two years include the use of tractors with either pusher-type or V-shaped locomotive plows, several types of machines for loading snow into trucks, including the "snow tank" and material-handling machinery slightly modified to handle snow and ice. The use of motor street sweepers has been advocated and will, undoubtedly, be successful if used from the very start of the snowfall to continually push the snow to the sides of the street where it may be taken up by hand or by different types of machinery. Such devices promptly used should prevent damage to pavement and trucks with its consequent losses and congestion of traffic.

THRASHINGS THAT RUIN BOTH PAVEMENT AND TRUCK

Automobile Headlight Regulations

By James R. Cravath
Illuminating Engineer

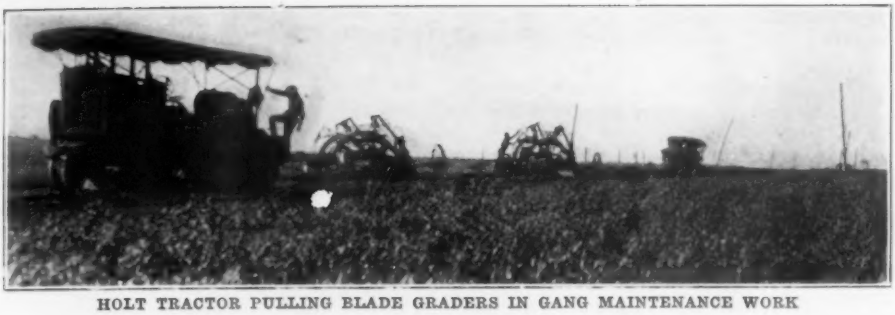
IT is interesting to note that at the present time states comprising about 25 per cent of the total automobile registrations in the United States have adopted the rules recommended jointly by the Headlight Specification Committee of the Illuminating Engineering Society and the Standards Committee of the Society of Automotive Engineers. Headlight regulations adopted by many states heretofore, with the idea of reducing the dangers of glaring headlights, have until the last two years necessarily been rather indefinite in specifications, because those expert in lighting matters had not themselves made the necessary tests to formulate definite specifications as to what could be permitted on the road without causing dangerous headlight glare. The committees referred to, however, have worked out such specifications, so that they are available for all states and municipalities desiring to pass regulations which represent the best unbiased expert opinion available.

These rules specify nothing as to the kind of appliances to be used on an automobile, but specify in candle-power at various points the results that must be attained by automobiles using the highway, if they are not to emit dangerous glare or dazzle and at the same time give sufficient light for safe driving and reasonable speed. They specify the candle-power in maximum and minimum values to be permitted at certain points 100 feet ahead of the car. The measurement of this candle-power would have been a rather elaborate operation a few years ago, but, thanks to recent developments in light-measuring apparatus, a small and relatively inexpensive, easily operated instrument is now available called a foot-candle meter, with which this can be done with reasonable accuracy by any intelligent man after a little instruction. The states which had adopted these standard specifications up to October 1, 1920, were Connecticut, New York, Pennsylvania, Maryland, Wisconsin, California, and the province of Ontario, Canada.

There was discussion at the last Illuminating Engineering Society convention, both formally and informally, regarding feasible methods of enforcing these headlight laws. It appeared to be the consensus of opinion of the experts in these discussions, that while punishment of the worst offenders will doubtless be necessary in the enforcement of any such law, education of garage mechanics and car owners in the making of proper headlight adjustments and the equipment of public garages with the necessary things to make such adjustments quickly and easily, are to be the most important elements in improving the general headlight situation. It was suggested that probably municipal testing stations would have to be established, where tests could be made with an instrument to determine whether a given car was violating the law, or certain officers would have to be equipped with instruments for making such tests on suitable stretches of road. The better equipment of public garages for headlight testing and repair and adjustments was strongly urged, and with proper law enforcement, it was pointed out, it would pay many garages so to equip themselves. The point was also made that headlight adjustments are difficult with most of the car equipment now on the market, and better appliances for focusing and pointing of headlights were urged.

It was evident from the discussion that the enforcement of these headlight laws will not take care of itself any more than the enforcement of various other laws on our books. The whole matter, however, is gradually drawing nearer to a satisfactory solution.

"If we are to regenerate our cities, to preserve their beauties, and to make them better, more is required than the good intentions of a group of technical experts or public servants; for this end a veritable civic conscience must be developed in all citizens."



HOLT TRACTOR PULLING BLADE GRADERS IN GANG MAINTENANCE WORK

A Comparison of Road Maintenance Methods

Team, Tractor and Truck Patrols Analyzed

By George E. Johnson
State Engineer, Lincoln, Nebraska

THE patrol maintenance system organized in Nebraska the first of April, 1920, has been in operation nearly a year, has covered a fairly good mileage, and offers a rather interesting and representative report.

At the beginning of the season, the five division engineers, each of whom has direct charge of a portion of the work on the state highway system, held meetings with the county boards of their respective divisions, at which time they took up the matter of county road maintenance and available funds. In nearly every county there were funds left over from the 1919 automobile license tax, and this amount, added to the minimum amount which the county board and the county treasurer estimated would be collected in that county for the 1920 automobile tax, constituted the total available fund for the maintenance expenditures on the state roads of each county.

Maintenance Methods

There are three methods of maintaining these roads, namely, by team, by truck, and by tractor. The team patrol consists of one man, who furnishes his own team and equipment, and who is paid an average of $175 per month. It can be seen that there is no depreciation cost, nor feed cost, nor interest on teams to take into consideration when figuring the cost per mile for such maintenance. The equipment necessary may be listed as follows:

1 six-foot blader
1 farm wagon
1 planer
1 scraper or fresno
1 plow
Small tools
6 miles average team patrol section

Two men are required for the truck patrol method, and each is paid $120 per month; the gas and oil are furnished by the county boards, which are, in turn, reimbursed by the state. This method is used where there is a large mileage to cover. The trucks used are part of the equipment turned over to the state by the war department, for use on state roads. The price of these trucks to the counties was the amount of freight and expense put on by the state, and averaged near $1,000, varying according to the type of body. The price of the trucks, were the county to purchase them at market value, would average from $3,500 to $5,000 apiece. This would necessarily increase the cost of maintenance accordingly. The equipment usually found is as follows:

1 truck
1 scraper
1 maintainer
2 planers
1 scraper or fresno
1 plow
17 miles average truck patrol section

The tractor patrol method also calls for two men, and is used in counties where such equipment was already on hand at the be-

ginning of 1920, the county having purchased it for county work, or preferring it to the other methods used.

The equipment necessary for such a maintenance patrol would consist of the following:

2 highway maintainers
2 small tractors
Plow
Wisconsin planer
Buck scraper
Shovels
14 miles average tractor patrol section

Investigation of Methods

In order to determine the best methods of maintenance, the writer visited twenty-two different states and investigated the methods used and the results obtained. It was concluded that the conditions in Wisconsin were the most similar to those in Nebraska, and that that state was getting a great deal more benefit from the money expended than any of the others. The Chief of the Bureau of Roads spent two weeks studying the methods of the Wisconsin Highway Department, and the results of his investigation were explained to the county officials before any definite system of maintenance was adopted.

Before completing a maintenance system, it was necessary to consider that the state had in its possession over 200 army trucks which were available for use on state roads. This fact made it necessary that a plan for patrol maintenance of this type be recommended to counties having a large mileage to cover. Also, in some of the counties in which portions of State and Federal Aid projects were partially completed during 1919 it was advised last fall that these counties do something toward maintaining the finished portion of these projects. As at that time teams were hard to find, and the army trucks not yet available, it was recommended that the counties purchase light farm tractors with which to pull the highway maintenance equipment. Thus the three types of maintaining state roads developed and were put in operation April 1, 1920.

Comparative Analysis of Methods

Now after four months of continuous operation it is possible to make a comparative analysis of the three methods used. In making the comparison, a three-month period of operation has been taken—April, May and June. The writer has not taken into consideration the conditions of the soils of the various roads maintained, nor the weather conditions, upon which the condition of all roads is dependent. This factor naturally enters into the costs, and either increases or lowers them, according to the existing conditions.

The following cost figures are quoted as an average, representative of the cost of the three kinds of patrol maintenance, per day, per mile, on roads which are a part of the state highway system. Attention should be called to the fact that it was necessary to buy a large part of the small equipment, as well as the machinery. Nevertheless, the counties taken show a representative amount and kind of work. It was necessary to include depreciation costs on all state-owned equipment, as well as on that owned by the county, in order to arrive at the actual cost per mile for the different types of maintenace.

AVERAGE COST OF TRACTOR PATROL APRIL, MAY, JUNE, 1920—14-MILE PATROL SECTION

Based on 5 Tractor Patrols

Total maintenance cost of *five* counties for *three*-month period, plus depreciation on equipment	$7,532.15
Total maintenance cost of *one* county for *three*-month period, plus depreciation on equipment	1,506.43
Cost of one patrol for *one* month	502.14
Cost of one patrol for *one* day	19.31
Cost of one patrol per mile per day	1.38

TOTAL MAINTENANCE COST OF TRUCK PATROL APRIL, MAY, JUNE, 1920—17 MILES AVERAGE PATROL SECTION

Based on 11 Truck Patrols

Total maintenance cost of 11 truck patrols for three-month period, plus depreciation on equipment—17-mile section	$13,692.64
Total maintenance cost of one truck patrol for three-month period	1,244.79
Cost of one patrol per month	414.94
Cost of one patrol per month	15.96
Cost of one patrol per mile per day	.94

TOTAL MAINTENANCE COST OF TEAM PATROL APRIL, MAY, JUNE, 1920—6 MILES AVERAGE PATROL SECTION

Based on 10 Team Patrols

Total maintenance cost of 10 team patrols for three-month period (several team patrols from one county)	$6,493.26
Total maintenance cost of one team patrol for three months	649.32
Cost of one patrol for one month	216.44
Cost of one patrol per day per mile	8.32
Cost of one patrol per mile per day	1.38

From the figures shown above it can be seen that the average cost of maintaining one mile per day by the tractor is $1.38. One must take into consideration, however, that this figure is based on a 14-mile patrol section; while the average cost of maintaining one mile per day by team is $1.38, it

is based on a 6-mile patrol section. It would seem from the figures that the tractor patrol covered twice the mileage covered by the team patrol, and at the same unit rate. This is not the case, however, as the cost of the team patrol per day is $8.32, and the section covered is 6 miles. In order to find the cost of the team patrol for 14 miles, it would be necessary to consider the same mileage. This means that the cost of 1⅓ team patrols would be added to the cost of 1 team patrol in order that the mileage covered should be 14; thus, $11.29 added to $8.28 will bring the cost of the team patrol for 14 miles to nearly the same figure as the tractor patrol cost for 14 miles, or $19.41, a difference of only 10 cents. The cost of the team and tractor patrol for a 14-mile section is practically the same.

THIS TYPE OF PATROL STATION HOUSES THE MAINTENANCE EQUIPMENT AND IS A HEADQUARTERS FOR THOSE WORKING ON STATE ROADS IN THE DISTRICT

For an all-round careful patrol the team cannot be excelled, as it is much easier to stop and fix ruts, small chuck-holes and the like when driving a team than when driving a tractor or a truck. In so far as the amount of work accomplished is concerned, this factor is entirely dependent upon the care of the patrolman, for a conscientious patrolman will work diligently, doing the most careful work possible in the shortest length of time. This is one reason why the Wisconsin State Highway Department favors the team patrol. However, in Nebraska, where there is a large mileage to cover, it has been found that the truck is perhaps the most economical and the best type of patrol.

The costs quoted are, as stated before, averages based on average patrol sections. The cost per day per mile does not actually mean that one mile is gone over but once for the cost quoted, but as many times as necessary.

In considering the influence of weather and soil, it must be appreciated that the condition of the road will determine the number of times the road will have to be gone over. The figures, on face value, would indicate that the truck maintenance method is the most desirable in all cases; however, there enters the matter of the reliability of machinery, against that of the teams. For instance, on a newly constructed grade, with deep fills, it is evident that the larger part of a patrolman's time will be spent in using the slip, if the patrol is team, while on a more level road a truck and a highway maintainer would take care of 90 per cent of the work.

There is one more thing that should be taken into consideration with regard to the cost per mile per day for the different kinds of patrol maintenance; that is, that the cost of each patrol section will materially decrease if the road is kept in first-class condition the greater part of each season. The back slopes in the cuts, especially, will soon become grass-covered, and thus will require little maintenance, as they do not wash. At the present time the new cuts have a tendency to wash, and unless there is some kind of ditch check, the slope will be worn in a short time. The patrolman should be vigilant in noting any tendency of this nature, and immediately place brush to protect the ditch washing, until such a time as he can furnish better protection.

The cost of patrol maintenance is a factor that is almost entirely under the control of the patrolman, for after the road is completed the problem of drainage and road surface belong entirely to him, and he must render the invaluable service of keeping it in first-class condition for the traveling public.

Novel Provisions of the Milwaukee Zoning Ordinance

By Arthur C. Comey
Consultant on City Planning, Cambridge, Mass.

MILWAUKEE is the third largest city in the United States to put zoning into effect. The ordinance presented by the Board of Public Land Commissioners and adopted by the City Council on November 15, 1920, combines many of the best features of ordinances in other cities, and in several respects goes a step in advance of any of them.

Relation Between Floor Space and Street Space

As the level central portion of the city was originally laid out with practically all streets 80 feet wide, thus facilitating the spreading out of the business section, the skyscraper problem could be attacked with more vigor than usual. A height limit of 125 feet, which approaches the ideal, was set for the district of tallest buildings. Compare this figure with that of any other city of 500,000 or more, or, in fact, with height limits of much smaller cities. Boston alone has as low a limit, necessitated in its case by a condition opposite to that in Milwaukee —the almost total lack of wide streets.

Towers up to 225 feet, the height limit previously in force, are permitted over one-quarter of the area of a building, but this will not materially reduce the light and air afforded nor increase the amount of traffic arising from the buildings. In fact, Milwaukee is probably the only large city which has established a relation between floor space and street space that will permit its business buildings to be served by a number of automobiles in any degree adequate for modern needs. Most cities are already faced with the utter impossibility of providing room for the operation, not to mention the storage, of even a fraction of the automobiles that would otherwise penetrate their central sections. Milwaukee, on the other hand, is perfecting its system of streets still further by projecting two great distributing arteries through its heart, one of which, 200 feet wide, is already authorized.* Its street system and its zoning provisions together make acute traffic congestion a remote problem. The gain to business alone of being readily reached by automobile would well repay this far-sighted policy, while other benefits, such as increased area of high land values and relatively low cost of transportation, affect a large part of the city's life.

Ventilation and Light Throughout the City Area

The indiscriminate location of apartment houses throughout the residential districts has just begun. Milwaukee has therefore been able to step in in time and stop this tendency. Apartment houses are absolutely excluded from large sections of the city by the requirement that in the 40-foot height districts no building used in any part for residence purposes by more than one family shall be in excess of two and one-half stories, the half-story being so defined that it cannot contain an independent apartment. Note that this provision is so drawn as to avoid unnecessary restriction of one-family dwellings, which may, if desired, be built to 40 feet. With this exception, residences are everywhere limited as to stories to somewhat lower heights than other buildings in the same height district, thereby nullifying any tendency to crowd in extra stories by reducing ceiling heights to the absolute minimum the law allows.

Every room must have windows equal to one-tenth its floor area opening on a street or alley, or on a yard or court of sufficient dimensions to give a fair amount of light and air even in the most dense building districts. In most of the city, where prevailing existing conditions have not forced crowding to be permitted, yards and courts are required to be so wide that there will be a really adequate supply. Furthermore, in the "D" area districts, which comprise most of the sections recently built or now building up, these required windows must open on a street or yard of reasonable size, and there must be at least one side yard; no building shall occupy more than 30 per cent

* See THE AMERICAN CITY, August, 1920, page 135.

THE FACTORY ON THE CORNER LOT DETRACTS FROM THE VALUE OF NEIGHBORING RESIDENCES

of an interior lot; and not more than twenty families shall be housed on any one acre of land, thus producing practically garden suburb conditions. In these and similar ways this city is providing as no other yet has for openness—ventilation and light throughout its area.

No Garages on Apartment House Lots

In residential districts small private garages are permitted as accessory to dwellings, but garages of any sort are absolutely prohibited on lots with apartment houses. Prior to the passage of the zoning ordinance one building was erected which provided space for one hundred automobiles on its first floor. A convenience for dwellers in the apartment house—granted: but consider the baneful effect on surrounding property, particularly opposite it, of introducing this business on a residential street. Furthermore, once built, how can cars of others than residents of the building be kept out of it? In other words, how prevent it from becoming to all intents a public garage?

The argument in favor of a small garage on a lot with an apartment house was disposed of by the consideration that only a few of its many families could benefit by its use, while all would suffer from the undisputed element of nuisance involved in any garage. Moreover, this would in such cases be accentuated, as among other things the proximity of apartment houses would increase the noise, and the garage would usurp much of the meager play space for children and at the same time introduce a new element of danger to them.

Definite as to Details

In its details the Milwaukee zoning ordinance includes many novel provisions designed to make it more exactly effective in the work it is to do. Reference can be made to a few of these only in this article. Uniform setback provisions apply in residence districts in "C" and "D" area districts where at least one-quarter of the frontage is built up. No new buildings except those between projecting buildings are permitted to project in front of the average setback unless they leave open spaces on each side twice as wide as they are deep. This will permit shallow bays and entrance porches and reasonable use of a narrow corner lot facing an intersecting street without material injury to the open front yards established by the majority.

Accessory uses—the "no man's land" of most zoning ordinances—are much more explicitly defined so as to prevent undue development of home industries or the nuisance of rented garage space. Permission for a certain amount of manufacturing in a local business district is strictly confined to products the major portion of which are to be sold at retail to the ultimate consumer. The method of fixing the precise boundaries shown on the map, as being either the center lines of streets or lines 120 feet back from the less restricted street unless otherwise indicated by dimensions, renders dispute impossible. In fact, throughout the ordinance little is left to the discretion of the building inspector. This is as welcome to him as it is to the architects and builders or property owners operating under the code.

The zoning ordinance was prepared with the legal advice of Hon. Edward M. Bassett, of New York City, who was invited to meet with the Board of Public Land Commissioners and its consultant for detailed consideration of the tentative ordinance prior to presentation of the printed report. Mr. Bassett's addresses to the City Council, the Rotary Club and to other civic organizations opened the publicity campaign, which enlisted wide support of the ordinance by the citizenship. His answers to destructive criticisms when the final draft was up in the Council helped to secure its passage practically intact. The zoning ordinance is already proving its value and promises to be of inestimable value to the Milwaukee of the future.

A Striking Message to City Officials on

THE PARALLEL PARADOXES OF THE "WAGE FUND" AND THE "TAX FUND"

Once upon a time a group of workmen held a meeting. Someone had a "happy thought." Said he:

"These hard times will make the amount of work to be done in this town much smaller than a year ago. So let us take it easy in our work, and thus secure jobs and wages for as many men as possible."

So the misguided conspirators cut down their hourly production. The result, of course, was an increase in unit costs to the manufacturer at a time when lower costs were needed to keep the factories going. And the "wage fund" became increasingly difficult for the employer to provide.

The workers realized too late that a wage fund can be created only by producing something that satisfies human wants, and that by redoubling their efforts they might have stimulated prosperity through a combination of lower prices, bigger sales and increasing employment. They know now—or will some day learn—that efficient work adds more to the wage fund than does the work of the slacker, and that a period of business depression is the time above all others when productive service should be rendered with the utmost vigor.

Once upon a time a city council held a meeting. Someone had a "happy thought." Said he:

"These hard times will make taxes in this town more difficult to collect than a year ago. So let us stop new construction work of all kinds, and appropriate the tax fund only for ordinary running expenses."

So the misguided city fathers cut down their bond issues and appropriations for public works. The result, of course, was increased unemployment there and elsewhere at a time when public works would have helped to restore the demand for labor and materials. And the "tax fund" became increasingly difficult for the citizens to raise.

The officials realized too late that the amount of collectible tax money depends on the prosperity of their citizens and the municipal assets of the community, and that there is much greater economy in issuing bonds for roads or waterworks or bridges or playgrounds than in breeding privation and discontent. They know now—or will some day learn—that well-planned municipal improvements add more to realty values than they cost, and that a period of business depression is the time above all others when the building of public works should be pushed with the utmost vigor.

Courtesy of Community Leadership

The Federal Employment Service estimates that 3,473,466 fewer persons were employed in industry in the United States in January, 1921, than a year ago. If you want your city to do its share in restoring local and national prosperity, the prompt and vigorous advocacy of a constructive program of public works would help greatly.

If not wholly convinced as to the wisdom of such a policy, please tell us why. Perhaps we can help you find the answer. Reprints are available of the editorial from The American City *for December, 1920, on "Public Works as Panic Prevention," if you want them.*

Modern Cast Iron Pipe

By A. F. Macallum
Commissioner of Work, Ottawa, Can.

WHILE cast iron pipe has been in use in France at Versailles for over 150 years, its use in America did not commence until about 1817. In that year cast iron pipe was laid in Philadelphia as an experiment, which was so successful that it has been almost exclusively used for water-mains, and more recently for gas-mains, since that date. It is a factor of great magnitude not only in the development of modern water-supply projects, but in the broadening of many industries.

While many attempts have been made to introduce varieties, the bell-and-spigot joint has been for over a century, and is yet, the standard joint, and because of its long use may be regarded as having proved its inherent merit of design. Flanged pipe, although made for the first installations, was found too rigid for underground lines, besides being more expensive, and is now used only for special purposes.

Cast iron pipe was generally cast on its side, but because of its tendency to be "out of round" or of uneven thickness, thus giving a pipe easily broken and unreliable, this method of casting was abandoned and the pipe was cast vertically in molds. This vertical casting of pipe gave very satisfactory results, although the pipe was still subject to blow-holes.

The New Method

The present specifications for cast iron pipe are based on iron having a tensile strength of 20,000 pounds. When higher standards are given under the present foundry methods and mixtures, the pipe is apt to be more brittle. On account, however, of new methods being adopted in the method of manufacturing iron pipe, consideration is now being given to the revision of the specifications to meet these new conditions. This new method, developed by DeLavaud, a French engineer, is now being used in this country after being subjected to tests in comparison with the ordinary standard cast iron pipe, by Professor Peter Gillespie of the Department of Applied Science, Toronto University.

The process of manufacturing this new type of cast iron pipe involves the application of the principle of centrifugal force to molten metal at a high temperature (about 1,800 degrees F.) in a permanent revolving mold. A regulated quantity of this cast iron is introduced into a revolving water-cooled cylinder where, by the centrifugal force exerted, the molten metal is spread uniformly upon the surface of the mold. Within a minute the pipe is withdrawn from the mold at a white heat. The pipe is brittle after leaving the mold, on account of the outer surface being chilled, but after passing through an annealing furnace it becomes tough and much stronger than ordinary cast iron pipe, as shown by the tests made by Professor Gillespie.

The pipe made under these conditions has a decided contrast in structure to pipe cast in sand molds, where the casting is much slower and has not the segregation of impurities often found in the sand cast pipe. As a consequence, the pipe is a homogenous, dense, fine-grained iron throughout, having no water or gas bubbles, and because of this density and strength the pipe can be made much thinner.

In tests made by Professor Gillespie a 6-inch pipe made by this machine was compared with a 6-inch Class C, ordinary sand-molded pipe, and out of the same iron, with the following results:

CENTRIFUGAL CAST PIPE

Thickness	.28 inches
Tensile strength	37,000 lbs. per sq. in.
Modulus of elasticity	14,500,000
Modulus of rupture	63,800
Quality factor	20.2

SAND CAST PIPE

Thickness	.51 inches
Tensile strength	16,000 lbs. per sq. in.
Modulus of elasticity	8,860,000
Modulus of rupture	33,900
Quality factor	9.8

From which it will be seen that the centrifugal pipe has a very high tensile cross-bending and resistance to shock values.

As found by these tests, the ratios of these to other coefficients similarly found for the sand-mold pipe from the same iron are as two to one, or twice as strong.

In the tests for corrosion made by Professor Gillespie he found no difference, but in tests made at Sao Paulo, Brazil, it was

found that the centrifugal cast pipe showed much better results than the sand-molded pipe.

In soils such as found in Ontario, it has been found that ordinary cast iron pipe has very little corrosion. The writer has removed a section of old English cast iron pipe laid in 1859 in Hamilton that showed no corrosion whatever, after being in the ground over 50 years, having even the weight marks clearly legible. This old English pipe was made much thinner than called for in the present-day specifications, and being on a rising main is still in service under more severe conditions from pressure than when laid. This centrifugal cast iron pipe has a smooth exterior and internal surface, and besides reducing hydraulic frictional losses, takes a much better surface coating.

It has been found that it machines easily, and because of the method of manufacture the wall thickness is practically exactly uniform.

Because of its double strength the centrifugal cast pipe can successfully be made considerably thinner than the sand cast pipe, and as a consequence a 12-foot pipe 6 inches in diameter will weigh only 240 pounds, compared with 430 pounds for a sand cast pipe of the same diameter, with the consequent saving in freight rates on shipments of the same quantity of pipe.

This light weight of the centrifugal cast iron pipe facilitates its laying, as a greater number can be calked on the ground and lowered into the trench. Besides, this latest development in the manufacture of iron pipe brings it into competition with steel pipe under conditions that had practically limited the field to steel pipe, and indicates an advance on previous methods.

Designing Roads from a Traffic Census or from Common Sense

Highway traffic is, of course, the first factor to be seriously considered in connection with pavement economics. Traffic is the thing which makes highway surfacings worth while, and the thing which wears them out. Its amount and its characteristics are important and should always be taken into account.

In a paper entitled "Relative Service Value of Pavement Types," A. R. Hirst, State Highway Engineer of Wisconsin, has offered some ideas to the Association of State Highway Officials which are worth serious consideration by all designing and constructing engineers:

"A preliminary traffic census is absolutely valueless in helping to determine the type of surfacing to be used. An inspection of the location of a road on the map, a knowledge of its relation to other roads and to the general highway system, and to business centers, together with a consideration of the business tributary to it and probably to be tributary to it, will tell a highway engineer who knows his business whether the construction in question should be first, second or third class. The traffic on a road last year or last month has absolutely no value in this connection, because when a highway becomes part of a superior highway system, or when one highway is paved with a surface superior to that on the adjacent and competing highways, traffic is so concentrated on that highway that what has been is no indication of what will be.

"Any assumption of what traffic will be is merely an assumption, and the presence on a certain past day of one hundred automobiles, ten trucks, eight farmers or their wives in single buggies, and three babies in their perambulators has really no bearing on the future situation.

"Traffic counts have value only as serving to give accurate information as to the constantly occurring changes in traffic conditions, and in determining the relative cost of services per unit given by various pavements. The unit cost per ton of carrying traffic is the important consideration, and, unfortunately, we have little or no information on this point.

"The fact that this type of pavement was maintained for so much per annum and that type for so much per annum, means little unless we know the amount and weight of the traffic served and that it was served adequately. Even then the information would not be conclusive, because the pavement which gave this unit cost under the prevailing soil and climatic conditions might give an entirely different unit cost under different soil and climatic conditions.

The Effect of Different Waters on Mains

With Interesting Results of Tests Before and After Cleaning

By J. E. Gibson

Engineer and Manager, Water Department, Charleston, S. C.

IN 1879, the City Council of Charleston granted to Jesse W. Starr, Jr., of Camden, N. J., a franchise for a public water-supply. This franchise provided for a supply of water to be obtained from artesian wells, and the laying of some twelve miles of cast iron pipe. These mains were located on the principal streets and the water-fronts of the Cooper and Ashley Rivers. They were for the most part 6-inch cast iron mains, but the mains on Broad, Meeting, King and Wentworth Streets were 8-, 10- and 12-inch diameter respectively, as they were feeder mains from the plant on George Street.

Water was first turned into the mains in 1880 and came from the artesian wells located at Wentworth and Meeting Streets and the Citadel Square. The artesian water was very soft, containing only 30 or 40 parts per million of hardness, but the total solids ran from 1,800 to 2,000 parts. It was highly prized for drinking and bathing purposes, but could not be used for cooking or manufacturing purposes on account of its high soda content. All starchy foods were turned a brownish green, and when the water was used in boilers a violent foaming ensued. This water had a temperature of 90 degrees F., and rapidly incrusted the pipe wherever the protective coating was defective.

From time to time additional artesian wells were put down. The normal yield from these wells was approximately 1,000,000 gallons per day, which was later increased by the use of the Pohle air lift to 2,000,000 gallons per day. The growth of the city was such that this supply soon became inadequate and it was not possible to furnish a full normal pressure throughout the twenty-four hours of the day.

In 1902 new capital was sought and a new franchise was granted for a water-supply to be obtained from a surface stream. The new water company took over the plant of the old water company and developed a supply of water from Goose Creek, the new pumping station being located about twelve miles north of the city limits.

Goose Creek is a tidal estuary of the Cooper River, having a total drainage area of 60 square miles at its junction with the Cooper River. The stream is very tortuous and is bordered alternately by wide, treeless marshes covered with a dense growth of salt-growing vegetation. At the site selected for the pumping station an earthen dam was thrown across the creek, and the tide-water was prevented from flowing upstream. The water above the dam was allowed to freshen because of rainfall and inflow, and this now forms the supply of water for the city of Charleston. The total drainage area above the dam is 42½ square miles, and the storage reservoir covers an area of 3½ square miles. The amount of water stored at the flow line elevation of the dam (10½ feet above low tide) is 2,780,000,000 gallons, and the average depth of the water is approximately 6 feet.

The drainage area is low-lying and generally covered with pine, cypress and kindred trees, and, in common with coastal waters from Maine to Texas, is highly colored with the vegetable organic matter of the swamps. The alkalinity usually runs from 10 to 15 p. p. m., and the color anywhere from 100 to 250, depending upon conditions of rainfall, vegetation, etc.

The water is filtered through gravity mechanical filters, the coagulant used being sulphate of alumina. To satisfactorily remove the color from water it has been found necessary to bring the water to practically a neutral or acid condition, and that is done in the treatment of the Goose Creek supply. The color is removed from a normal of, say, 180 to about 25 p. p. m., and in so doing the alkalinity is reduced from an average of 12 to about 2 p. p. m., below which point it is not deemed advisable to go. After filtration there is sufficient lime, in the form of lime water, added to the filtrate to restore the alkalinity to about 18 p. p. m., and to reduce the carbon dioxide

content of the filtered water to form 2 to 3 p. p. m. The total solids, after treatment, average about 70 to 100.

This water was first introduced into the city mains in the fall of 1903, and, because sufficient time had not elapsed for the dilution of the salt in the flooded marshes, or for the reduction of color due to the heavy vegetable stain, it was not anywhere near the present quality.

It will be noted, therefore, that artesian water was supplied from 1880 to the winter of 1903, and since that date Goose Creek water has been supplied through the mains. No change has been made in the piping system during all these years except to take care of the natural growth of the city.

On October 1, 1917, the city by purchase took over the plant of the private company, since which time it has been operated as a municipal corporation. The increasing values of real estate and storage warehouses along the river fronts demanded increased fire protection, and in the fall of 1918 the Commissioners of Public Works, who operated the plant for the city, authorized the department to lay reinforcing mains along the river fronts in the congested districts.

Cleaning the Mains

At the same time it was deemed advisable to clean the existing mains, and a contract was made with the National Water Main Cleaning Company for the use of one of its cleaning machines. In all, some six miles of mains were cleaned, the work extending over a period of about six months. The writer believes the method of cleaning water-mains is pretty generally understood, yet a short description may not be amiss.

The stretch of main to be cleaned was first opened up at two points, usually from 400 to 600 feet apart. A small carrier, made up of three cup leathers (similar to those used in a hand bilge pump) fastened together by flexible connections, were attached to a small cable (¼-inch in diameter) and introduced in the main at one of the openings. The ends of the mains were plugged by means of wooden plugs, with a 2-inch pipe connecting the two plugs, the small cable passing through a small hole in the side of the plug. Water was then admitted through the plugs and the connecting 2-inch pipe to the rear of the cup leather carrier, which was forced through the main, pulling the cable with it. As soon as the cable appeared at the second opening, the pressure was shut off, the carrier removed and the small cable made fast to the large cable (about ⅝-inch diameter), which was then pulled backward through the main to the first opening or point of introduction of the carrier. The wooden plugs were removed and the large cable made fast to the cleaning machine proper, which was then placed in the main and the opening closed up with a piece of cast iron pipe and sleeve joints.

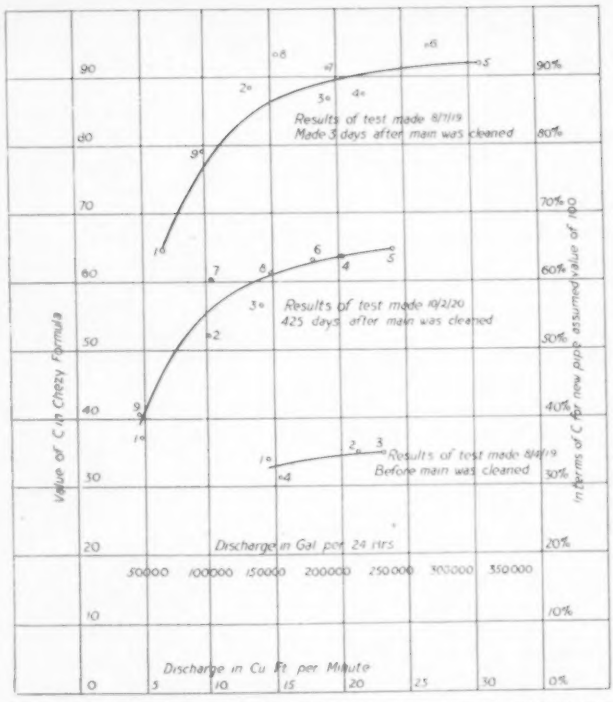
The cleaning machine proper consisted of a number of blades, similar to an ordinary boiler flue scraper, the blades being set in three or four groups and spaced around the circle so that the entire circumference of the pipe was covered. The blades of the cleaning machine were made of tempered steel and set out slightly larger in diameter than the diameter of the pipe. Sometimes the leading or forward blades on the machine are made saw-tooth; the rear blades are always perfectly plain. On all of the work done at Charleston plain blades were used, as we wanted to preserve the coating of the pipe if possible. We found, however, that practically all of the coating had been destroyed, probably by time. As soon as the opening in the main was closed, scraping was begun by attaching the opposite end of the cable to a heavy winch which could be turned by two men each, on opposite cranks. At the same time, water was turned into the main from the rear of the cleaner so that all material scraped from the sides of the main was washed forward and out of the main at the opening. Usually it required about eight hours to cut in and clean 600 feet of main. This time does not include the time of digging the openings in the streets, but it does include the time of cutting the main and replacing the sections cut out.

Carrying Capacity of Mains

It was not possible, on account of other work being carried on at the same time, to test all the mains for carrying capacity before and after cleaning, but one complete test was made on what was considered a typical case. The main tested was located on Legare Street between Lamboll and Tradd Streets, a total distance of 755½ feet. This main was laid in 1880

and had never been cleaned.

There were three hydrants located on this main, two 755½ feet apart, and the third 300 feet further. The third hydrant was connected by means of pipe to a 2-inch Trident Crest meter, the first and second hydrants were connected by means of a ¾-inch galvanized pipe and U-tube filled with mercury, and all other valves and supplies were cut off, except the one at the Tradd Street end. It will be seen, therefore, that by opening the third hydrant a flow was created in the length of pipe and the friction loss between the first and second hydrants could be noted from the U-tube, and the quantity of water passing through the main would be measured by the 2-inch Trident meter. There were three sets of tests made: (1) before cleaning; (2) immediately after cleaning; and (3) fourteen months after cleaning. On account of the third hydrant's having a loose seat on the stem, it was not possible to make the first series of tests to cover the low rate of flow, as this loose seat acted as a ram, causing water-hammer in the main.


Results of test made 8/7/19
Made 3 days after main was cleaned
Results of test made 10/2/20
425 days after main was cleaned
Results of test made 8/4/19
Before main was cleaned
Value of C in Chezy Formula
Discharge in Gal per 24 Hrs
Discharge in Cu Ft per Minute
Per cent of value of C assumed as 100 for new cast iron pipe

RESULTS OF TESTS OF MAIN BEFORE AND AFTER CLEANING

The values of coefficient "C" in Chezy's Formula, $V = C\sqrt{RS}$, was determined, and these values are given in the accompanying diagram. It will be noted that each test consisted of two series, that is, increasing and decreasing velocities. The result of each test as plotted represents ten individual observations, and the curves shown have been drawn by inspection. The rates of discharge are given in cubic feet per minute and in gallons per twenty-four hours. On the right hand of the graph, the results are shown in per cent on the assumed value of C of 100 for new cast-iron pipe. This is not absolutely correct, as authorities vary, giving the value of C as low as 95 for low velocities and 110 for high velocities, but nevertheless the figures are comparable. It will be seen that for the 40-year pipe the value of C had fallen to 34, and immediately after cleaning, this coefficient was increased to about 90, and that within a period of fourteen months it had again deteriorated until the value was about 61.

This was rather disappointing to the writer, although he had been somewhat prepared from a previous experience on the 24-inch supply main leading to the city. These former tests indicated that it is reasonable to expect a main that has been once cleaned to deteriorate more rapidly than new main, because in scraping the tubercles from the mains the protective coating is more or less destroyed, and there is left a rough and pitted surface which offers a maximum condition for rust and corrosion. This may be further aggravated should the water contain vegetable or other acids, which would set up differences of polarity between the adjacent parts of the pipe.

Goose Creek water is maintained at about 18 parts of alkalinity, which is certainly

positively alkaline, but there is a possibility that all waters (particularly along the coastal plain) contain acids that attack metals. We learn by experience, and it has been found that if the Goose Creek water is maintained at an alkalinity of from 12 to 15 p. p. m., little trouble is experienced due to red water or corrosion in the hot water pipes of house boilers, but below this point considerable trouble is experienced.

It has been noted by the writer that the amount of the corrosion or tubercles does not so much reduce the carrying capacity of the main as the nature of the internal surface of the pipe.

In 1915, 11 miles of the 24-inch cast-iron main delivering water into the city were cleaned, and within a period of three months after cleaning, the friction loss had substantially increased to that before cleaning, and it was again determined to clean this main. The actual cleaning, however, did not take place until about twelve months after the first cleaning.

Results of First and Second Cleanings

Before the first cleaning, judging from pieces of pipe that were removed to insert the cleaning machine, it was found that the internal surface of the main was covered with large tubercles, projecting as much as ½ to ¾ of an inch, and having a diameter of 1½ inches or more. They were fairly close together, and the entire surface showed a tuberculated condition.

At the second cleaning of the main, some of the pipe formerly cleaned was removed, and it was found that the inner surface was covered with innumerable tubercles, having a diameter of about ¼-inch and projecting about ¼-inch. They were much more numerous than in the first cleaning and looked as if someone had taken a pepper-shaker and peppered the entire surface of the main. The friction loss before the second cleaning was about the same as that with the larger tubercles. The protective coating had been more or less destroyed by the first cleaning, and the condition of the water pumped through the main undoubtedly promoted the growth of the tubercles. After the first cleaning and for a period of sixty days the water pumped through the main had an alkalinity of less than 5 p. p. m., using the erythrosine method.

It is known that this method for determining alkalinity is not delicate to within 3 or 4 p. p. m., and, undoubtedly, at times the water was acid and had a high carbonic acid content all of the time.

After the second cleaning the water was carried exceptionally high in alkalinity, with the hope that a deposit of calcium sulphate might be obtained on the main. This does not seem to have taken place, although the carrying capacity of the main had not deteriorated nearly so rapidly as after the first cleaning.

Since the above main was cleaned, an additional main has been laid for some 30,000 feet, duplicating the 24-inch main, and it is hoped that in the near future, friction losses can be obtained for the 30,000 feet of old 24-inch main, using the new parallel main as a piezometric pipe.

On the Calendar of Conventions

FEBRUARY 14-20.—NEW YORK CITY.
National Civic Federation. Annual meeting. Secretary, D. L. Cease, 1 Madison Avenue, New York, N. Y.

FEBRUARY 17-19.—PORT HURON, MICH.
Michigan Commercial Secretaries' Association. Semi-annual meeting. Secretary, C. W. Otto, Board of Commerce, Pontiac, Mich.

FEBRUARY 24-25.—ELLENSBURG, WASH.
Washington Association of Commercial Organization Secretaries. Semi-annual meeting. Secretary, A. F. Marsh, Chehalis, Wash.

FEBRUARY 25-26.—HARRISBURG, PA.
Pennsylvania Commercial Secretaries' Association. Semi-annual convention, Secretary, E. J. Fellow, Chamber of Commerce, Lebanon, Pa.

FEBRUARY 26-MARCH 3.—ATLANTIC CITY, N. J.
National Education Association—Department of Superintendence. Annual meeting. Secretary, Miss Charl O. Williams, Superintendent of Schools, Memphis, Tenn.

FEBRUARY 26-MARCH 3.—ATLANTIC CITY, N. J.
National Community Center Association.. Annual meeting. Secretary, Eugene C. Gibney, 70 Fifth Avenue, New York, N. Y.

MARCH 9-11.—REGINA, SASK.
Saskatchewan Association of Rural Municipalities. Annual convention. Annual convention. Secretary, E. G. Hingley, Farmers' Building, Regina, Sask.

APRIL 27-29.—ATLANTIC CITY, N. J.
Chamber of Commerce of the United States of America. Annual meeting. Secretary, Elliot H. Goodwin, Riggs Building, Washington, D. C.

An All-Season Playground

Asphalt Paved Tennis Courts Used for Skating Rinks in Winter in Gary, Ind.

IN order that a tennis court or playground may be termed an all-year investment, some provision must be made to use the area for winter sports.

A close study of the situation when the courts in Gary were built led the officials to decide to lay a smooth sheet asphalt wearing surface which would give an excellent tennis court in warm weather and which could withstand the damaging effects of a surface of ice for skating purposes in winter. The playing surface was laid as follows: First the plot was excavated so as to allow for the laying of the base and the sheet asphalt wearing surface. Then a curb of concrete 6 inches wide and 16 inches deep was laid around the entire lot. Drains were constructed and pipes placed at the back of the court to hold the wire for the back-stops, and then tennis-net supports were set. After this, a layer of stone ranging in size from 1 to 2½ inches was spread over the entire surface, in such quantities as to provide a depth of 5 inches after it had been rolled and consolidated. Texaco asphalt paving cement was then spread over the broken stone by means of hand-pouring pots, using about 1½ gallons per square yard. This was covered lightly with clean stone chips free from dust, and then the entire area was compacted with a 5-ton roller. Just enough stone chips were then applied so that upon rolling they were forced into the surface voids of the asphalt-coated stone, leaving no excess of asphalt on the surface. The next step was to lay a binder course 1 inch in depth, and then a 1-inch sheet asphalt wearing surface, laid in the usual manner.

These courts were constructed during the summer of 1919 and used as a skating rink last winter. The curb was allowed to extend about 3 inches above the asphaltic surface, and during the winter the drainage inlets were plugged and the courts were flooded with water. Upon freezing, they furnished an excellent skating rink. The contractors for this work were the Municipal Contracting & Supply Company, Gary, Ind. The accompanying illustration shows the court in summer being used as a playground.

Photographs courtesy The Texas Company

IN WINTER THIS SHEET ASPHALT TENNIS COURT IS FLOODED TO MAKE AN IDEAL SKATING RINK

The Maintenance of Brick Pavements

By Oscar F. Weissgerber
City Engineer, Appleton, Wis.

IN many cities there are brick pavements in which the brick have worn down on the edges and become like small cobblestones, causing a great deal of noise, and inconvenience to business places and to the public at large. The annoyance is especially great when solid-tired vehicles, such as drays or other horse-drawn wagons clatter over the streets. Cities that have had this experience will be interested in a piece of work recently completed in Appleton, Wis.

The work was done on College Avenue and on one block of Washington Street, where brick pavements were laid in 1908. The pavement on College Avenue was a Purington brick, the best in the market in those days, and, in fact, a good brick to-day. On Washington Street the brick used was softer and inferior to the Purington. There were places where the joints were worn down between the bricks from ½ to 1¼ inches from the original surface, thus presenting a very rough, corrugated surface. On both streets an asphalt filler was used that had been recommended on account of not being noisy. For awhile that was the case, but as the asphalt wore down, being gouged out by horseshoes, etc., it left the edges of the brick unprotected, with the result as stated above.

Numerous suggestions were made about turning the brick over, but the expense involved was considerable. There were 29,054 square yards, and the lowest estimate, of $1 per yard for turning and cleaning, did not include the cost of new brick to replace any that might be broken. Information was asked for from several cities, but none of them had any data as to expense for similar work. In August, 1919, the writer tried an experiment with about 200 square yards of the roughest piece of pavement, where the travel was the heaviest, with such good results that the Mayor and Council authorized the expense of the whole work. This has now been completed, and the benefit derived is more than was expected.

Before the improvement, the pavement, besides being noisy, was unsanitary. Although we flushed our streets twice a week, and oftener if necessary, between periods of flushing the refuse would get in the crevices and dry, and finally blow around. To-day the street is smooth, is much more easily kept clean, and the cost of cleaning has been materially reduced.

Method of Surfacing Worn Pavement

The pavement was thoroughly flushed and cleaned with the ordinary street flushers. After flushing, a crew of men went over the surface with brooms and small hooks to get all the dirt between the joints that the flushers would not take out. A horse-drawn street broom was used to remove the heavy material accumulated by the flushers in the gutters, where it was picked up and hauled away.

After the pavement was thoroughly dry, another crew of men spread a coating of Tarvia "A" on the surface of the brick, leaving it about ¼-inch thick. This material was heated in a kettle holding about four barrels, but there were never more than three in it at one time, on account of danger of overheating and fire.

The binder was heated to the point where it would run freely from the faucet, or to a temperature of about 225 degrees F., and then carried in buckets to men who used ordinary floor squeegees with a rubber edge, similar to those used in drying floors after scrubbing. The material was spread evenly, and then a coating of pea or roofing gravel was spread to a depth of about ½-inch.

After the gravel was applied, a 10-ton roller was run over the surface. The roller forced the gravel into the binder in the joints between the brick, and the gravel that lay on the surface of the brick was generally crushed into several smaller pieces. After rolling was completed, the street was immediately opened for traffic.

This work should be done on a warm day, not on a hot one, as the brick get hot in the sun, and the material has a tendency to run to the gutter if too warm. It should be covered immediately to prevent its doing so.

The best results were obtained with pea gravel, although some limestone screenings were used and also coarse Janesville sand.

APPLYING BITUMINOUS SURFACING TO OLD BRICK PAVEMENT
Photograph shows heating, pouring and squeegeeing of binder in August, 1920

Unless the screenings are hard and tough, they should not be considered. The entire yardage was completed in ten days, which included the cleaning, applying binder rolling, etc. The entire cost of the work was as follows:

267 bbls. Tarvia "A" @ $8.313	$2,219.57
Freight	119.72
Labor and teaming, including unloading and distributing material	1,454.01
Supplies, tools, etc.	67.23
Gravel, screenings and sand	740.24
	$4,600.77

With 29,054 square yards covered at this amount, the unit cost per square yard amounts to 15.8 cents. Comparing this with the turning of the brick as mentioned in the first part of this article, it will readily be seen that the saving is considerable.

For estimates for similar work for any city that contemplates using this method, the following may be taken as an average:

1 barrel Tarvia, average of 50 gallons covered 108.8 square yards, about ½-gallon to the yard
302 cubic yards of sand, gravel and screenings used, or one cubic yard covered 96.5 square yards
Labor was paid from 41 to 45 cents per hour
Foreman at $5.00 per day and teams at 90 cents per hour
Engineer and roller $5.00 per day
Pea gravel cost $2.60 per ton, f.o.b. Appleton
Supplies consisted of gasoline for roller, wood for tar kettle, and scrapers and brooms for workmen

The pavements treated, in the writer's estimation, will wear for several years with the single coat, although it is recommended that another coat be put on next season.

In all cases where similar work of this kind is contemplated, the writer would recommend the double mat coat treatment—that is, a second coat of Tarvia "A" and gravel—applied in about 30 days after the first treatment is applied, or just as soon as the first coat has thoroughly ironed out.

The second coat would not be nearly as expensive as the first, as the cleaning of the crevices in the pavement would be eliminated. Neither would as much binder be used, and with these additional coats a mat would be obtained the care of which would be only in proportion to the amount of travel.

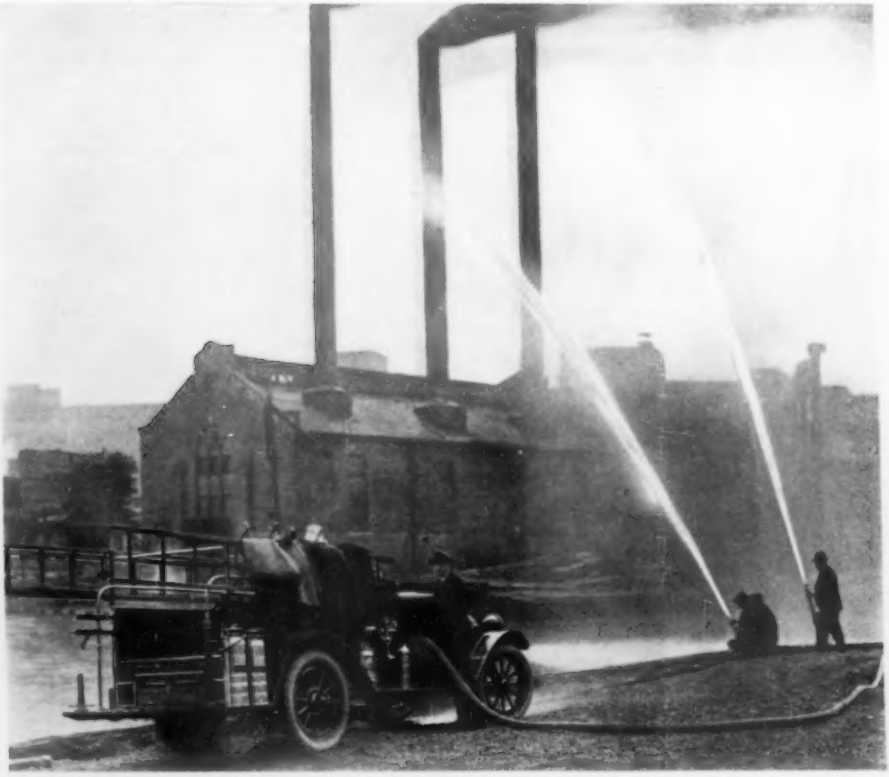
The City Council has decided to treat another street where conditions are similar and where a recent count of traffic showed 400 vehicles in 1¼ hours. This street is one of the entrances to the city and carries all the heavy dairying and trucking to neighboring cities.

Versatility Characterizes Municipal Motor Trucks

A SERVICE MOTOR TRUCK OWNED BY THE KANSAS CITY, KANS., LIGHT AND WATER DEPARTMENT

PART OF ONONDAGA COUNTY'S FLEET OF 19 WHITE TRUCKS HAULING STONE FROM THE JAMESVILLE QUARRIES

A GMC CHEMICAL AND SERVICE TRUCK IN USE BY THE CITY OF PUTNAM, CONN.



TESTING A REO FIRE TRUCK FOR CAPACITY AND PRESSURE

Snow Removal in American Cities

Clear Streets in Winter Essential to Municipal and Business Transportation

THE importance of keeping at least the main municipal arteries of travel free from snow is growing rapidly, as a result of the increasing use of the motor vehicle for municipal and business purposes. The solution of the snow removal problem in cities is therefore of prime importance. In order to make available to municipal officials complete and up-to-date information on snow removal methods in American cities, the kind of apparatus now used, and the suggestions and opinions of experts and others who have studied the subject, the New York State Bureau of Municipal Information has sought reports from American cities, a summary of which THE AMERICAN CITY takes pleasure in printing below.

Methods of Attack

There are three distinct methods of attacking the snow problem:

1. Clearing streets for traffic
2. Snow removal
3. Snow fighting

Until recent years, the custom in all cities was to wait until the storm ceased before beginning snow removal. Several cities now recognize the efficacy of beginning work while the snow is falling. These cities have a snow alarm which sounds whenever indications point to a heavy fall of snow, or when a certain amount has fallen. Efficient snow-fighting methods involve three things:

1. Preparedness
2. Organization
3. Equipment

The consensus of opinion is that, wherever possible, effective machinery should be used, thereby reducing dependence on labor to a minimum. It is pointed out, however, that care should be exercised in investments for equipment; machinery used exclusively for snow fighting is idle so much of the time that every effort should be made to use whatever available city apparatus can be temporarily converted into use for snow fighting. In the spring, summer and fall, this apparatus should be available for other municipal services.

How Some American Cities Remove Snow

Albany, N. Y.—On wide streets, motor trucks are used, with hand loading, while on narrow streets hand-loaded teams are used. On wide streets having large sewers with good flow of water, horse-drawn snow scrapers carry the snow to sewer manholes. Horse-drawn road graders are used to open streets in outlying sections. The operation is as efficient as could be expected without special snow-removal equipment.

Amsterdam, N. Y.—On streets with trolley tracks snow removal is accomplished by the traction company and city forces coöperating. On residential streets, a heavy snow-plow drawn by horses is used, and six miles of streets are opened wide enough for one-way traffic.

Binghamton, N. Y.—Hand shoveling to dump-wagons and trucks with hoists, and disposal of snow through manholes in floors of bridges over the Chenango River, are used in this city. Snow is first removed from the zones established on the principal business streets for passengers getting on and off street cars, and then the work is extended throughout the city. Snow-plows are used on streets where there are no trolley tracks and where there is a considerable amount of traffic.

Buffalo, N. Y.—Plows attached to tractors perform satisfactorily, and ordinary plows are used to furrow the snow toward the gutters. In the business sections the furrows are picked up by snow removers of a capacity of approximately 2½ cubic yards. The cost of removing this snow was 7 cents per cubic yard in 1919-20. The snow was dumped into manholes over two large 8-foot sewers. Snow-fences were used on the outskirts, and a tractor plow to move the snow into the gutters on residential streets. Exceedingly high drifts up to 15 feet could not be handled by any machinery available and had to be attacked by hand labor.

Corning, N. Y.—Snow was removed last winter at a cost of 31 cents per cubic yard by team-drawn scrapers, loaded into sleighs and carted to the river bank, where it was deposited. It is planned to use a motor truck with snow blade scraper in front and a dump rigging and dump trailer attached which will probably cut the cost of snow removal in half.

Geneva, N. Y.—Snow is carted away in the business sections and packed in the residential sections.

Jamestown, N. Y.—Hand labor and horse-drawn wagons were used last year to remove the snow, which is dumped into the river. This proved a very slow method. Outside men owning horses are employed and paid according to the length of the route covered and the difficulties encountered. For cleaning sidewalks the city is divided into 32 routes. When it snows during the late afternoon or night, the police department calls the snow-plow men on the phone, usually about 3 A. M., and between the hours of 6 A. M. and 6 P. M. the calls are made by the Superintendent of Streets. There are 100 miles of streets, so that the men cover about 200 miles. They are usually through by the time pedestrians appear, between 6 and 6:30 A. M. The system works well and obviates the necessity of wading through drifts, as the early workers and school children would have to if the sidewalks were cleared by individual property owners.

New York City.—The organization for snow work in New York City is divided into three classes: (1) snow fighting, to be composed of the department force and equipment augmented by hired laborers; (2) the contractors' forces for the removal of snow after the storm ceases; (3) street railway forces, which are under the direction of the street railway companies, consigned to the streets which they are obliged to clear of snow under the terms of their contract with the city and their respective franchises. In the plan of coöperation between the Street Cleaning, Fire and Police Departments, two policemen and two firemen who are licensed chauffeurs are assigned to operate Caterpillar tractors. The general plan of operating the tractors together with the 5-ton auto trucks of the Department is as follows:

As soon as a snowfall starts and it is believed there will be a continued storm, orders are issued to have the tractors and trucks begin work. The plows are attached to the trucks at various angles, and the police, fire and street cleaning operators who are assigned to this work are called to report immediately for duty and to proceed at once to the points they are to plow. The plows in teams of two clean a width of 20 feet of roadway for a distance of 3 lineal miles in one hour, and continue working over such a route after the snow has ceased falling. The average rate of snowfall is ¼-inch per hour, and the motor-driven plows, operating at a speed of 3 miles an hour, can cover the entire area every two hours, constantly plowing one inch of snow on each trip up and down the assigned area.

With 150 tractors and 250 5-ton trucks operating, all of which have snow-plows attached, starting at 200 different points and covering 3 lineal miles, cleaning 20 feet of roadway, the Department plows at the cessation of each snowfall 600 miles of roadway in the important sections of the city; 70 per cent of this is in the borough of Manhattan, so that there is no such interruption of traffic as practically paralyzed the trucking business last year and caused the loss of millions of dollars.

This work is alternated with the use of hired motor trucks to which Department snow-plows are attached. About 100 of these are engaged in work in the same manner as the Department trucks and tractors, covering an additional 150 miles of roadway. This total force operates within one hour after the call has been issued by the Commissioner, so that if the storm is in progress one hour and it is decided to call out the forces, all of the equipment is in motion within two hours after the storm starts; in other words, the full force of motor trucks and tractors is operating when the snow reaches the depth of one inch.

The first point in the work of snow removal is to keep the traffic moving. This is accomplished by throwing the snow from the center to the sides of the roadway. The second point is to have the snow removed as quickly as possible after it is thrown to the sides. For this purpose 100 2-ton Department trucks and the Department force of carts, 500 in number, are utilized on the first day of each storm, to haul the snow to the most convenient disposal points, such as sewers and water-front dumps. During the progress of the storm the laborers are assigned to work at the same time as the call is issued for the plow to start out, and they pile the snow just as soon as it is thrown to the side of the road by the plows. This obviates delays while waiting for the contractor's forces to begin work, which is usually the following day.

After they stop plowing, the plows attached to the tractors are used to remove snow from the roadways to the sewer manholes, which means that 150 tractors are busy pushing snow on all streets where sewers are available, and in this way great quantities of snow are removed quickly.

Emergency men have been registered in order to have an available snow-fighting force of laborers ready to report at the 103 section stations throughout the three boroughs, at which places they are equipped with picks, shovels and pan scrapers, and under the direction of squad leaders they are assigned to certain routes for sewering or piling the snow, depending upon the type of sewer adjacent to the various points at which they are assigned to work. The rates of pay to attract a sufficient number of laborers for snow work are determined from time to time upon a survey of labor conditions.

Schenectady, N. Y.—Ten-ton Holt Caterpillar tractors were secured from the Government warehouse in Schenectady in 1919-20 and were used to push a 13-foot and a 16-foot triangular snow-plow, opening up the important arteries of traffic quite rapidly and effectively.

Sherrill, N. Y.—The roads were opened up for automobiles with a 16-foot snow-plow drawn by six horses. A heavier snow-plow mounted on a tractor will be used this winter.

Cambridge, Mass.—Horse-drawn levelers are used to break down drift piles on the side streets after the householders have had sufficient time to clear the sidewalks. Following this, gutter plows are used to open up the gutters to prevent flooding during a thaw.

Chicago, Ill.—The equipment consists of 35 snow-plows which can be attached to 5-ton trucks. These plows are used to open up the business streets to traffic. Men and trucks are hired to pile and cart all the snow to the dumps. A permanent special snow organization is maintained, consisting of a specially trained group of street bureau employes assigned to a snow squad.

Cincinnati, Ohio—Regular organized snow gangs are maintained, to report at specified places under the leadership of their district foremen. Work is started at the center of the city and branched out from there, gathering the snow and dumping it in special sewers wherein are installed flush valves to run the snow through the sewer. These flush valves are maintained only in the center of the city. In the suburban districts the main transfer points are cleared, so as to inconvenience street car traffic as little as possible. Tractor plows and motor trucks are used to facilitate work.

Dayton, Ohio—Baker auto snow-plows attached to 5½-ton trucks are used, and snow is hauled away by teams and trucks.

Indianapolis, Ind.—Snow is removed by the efficient service of the street railway company, and no fall has yet been heavy enough to prevent the company from clearing its tracks. The city removes all snow from the streets, including that which the street car company throws from its tracks. No special equipment is used; the old hand shovel is supplemented at times by home-made plows drawn by horses.

Milwaukee, Wis.—When snow accumulates up to 2 inches, pan-scraping is resorted to, and the snow is removed by teams and trucks to the regular dumps.

Newark, N. J.—After 3 inches of snow has fallen, motor flushers with snow-plow attachments are sent out to push the snow to the gutters, and in the morning it is removed with motor trucks and teams and dumped into sewers if the flow is sufficient to carry it; if not, it is dumped into the Passaic River.

Philadelphia, Pa.—The Bureau of Highways and Street Cleaning has successfully maintained a snow alarm for the last three years. At any hour of the night as soon as the snow starts to fall, the Electrical Bureau notifies the Chief of the Bureau and the engineers in charge by telephone in their respective homes. Each engineer living in the central part of the city is in constant communication with the Weather Bureau and the Chief of the Bureau of Highways, and as soon as the indications point to a continuance of the storm, the snow-fighting equipment is called out. Upwards of 1,000 telephone messages are sent to various parts of the city in calling out squad leaders, inspectors, snow-plows, drivers, team laborers, and officers in various police districts, who aid in getting out the men. In about one hour after the order is given, the horse-drawn plows and motor-driven plows attack the snow in the central business section of the city. These plows are supplemented by laborers with teams, who keep constantly at work day and night, dumping the snow into the Delaware and Schuylkill Rivers.

Every man in the snow removal organization has a particular function assigned to him. Each dump inspector knows his post, and knows just what to do when he gets there. The driver of every snow-plow and every team knows at what point he is to start to load and at what sewer manhole or wharf he is to dump his load. Thus confusion is eliminated. Fighting the snow at night during some of the storms in the last three years has not been an easy task. In the central section of the city snow is removed from all thoroughfares. This work is performed under special contracts and supplemented by the regular street cleaning force, and is under the supervision of a special snow removal organization made up of men assigned to this work from the regular engineering staff. Certain main thoroughfares and all the street crossings throughout the entire city are also cleaned by the regular street cleaning forces, and a large municipal force is assigned to the seven highway district engineers, who supervise this work. A large force is always employed opening up the country roads, where the drifts often completely block traffic. All told, the force employed on snow removal consists of about 4,000 men, 1,200 trams, and 38 horse-drawn and 20 motor plows.

To ensure the efficient operation of snow removal work, the following instructions and forms have been provided:

(a) A set of detailed instructions which definitely indicate to the persons supervising the work, the nature of the work to be done and the methods to be used in its performance

(b) A map indicating the highways included in each of the nineteen central snow removal districts and the nature and exact location of the snow dumps

(c) An organization schedule indicating the name,

call address, telephone number, and the assignment of each person detailed to snow removal supervision
(d) Tickets of distinctive colors for loading and dumping respectively
(e) Ticket issue records
(f) Current status of work records
(g) Squad leaders' daily reports
(h) Squad leaders' daily report summary

The central business section is divided into 19 districts, each district being under the supervision of a squad leader to whom is assigned a number of inspectors, some of whom supervise the removal of snow, while others see that it is properly disposed of at the dumping places. The inspectors supervising the snow removal see that the snow is properly plowed into windrows adjacent to the curb and then piled up and hauled to the dump. They are also required to measure and calculate the cubic capacity of all hauling vehicles and see that they are properly loaded, after which they give the driver a loading ticket, to be exchanged at the dump for another ticket, which is retained by the driver and upon which payment is made.

The inspectors at the dumping places are required to see that the snow is properly dumped and that no improper material likely to obstruct the sewer is mixed with the snow. In sewers where there is not a sufficient flow of water, a water jet has been provided, which serves to increase the flow of the sewer, and this is regulated by the inspector.

Worcester, Mass.—A four-horse scraper is used to throw the snow back from the street railway tracks to the curb, thus forming a windrow, which permits the teams with carts to stand for loading between the car track and the windrow, without danger. Snow is loaded into sleds and drawn to the main sewer and dumped through manholes. The snow melts after going a short distance and goes through the regular filtering beds on the outskirts of the city.

Highway Research Work Assured

The Engineering Foundation, the Chairman of which is Charles F. Rand, 71 Broadway, New York City, past President of the American Institute of Mining and Metallurgical Engineers, has already raised a fund of $500,000 to be applied to highway research. The Foundation is seeking to increase this fund to $5,000,000, the income of which will readily carry out the work.

Functioning through the Engineering Division of the National Research Council, it is planned to coöperate all the agencies in highway research and, aided by the Federal Government, to employ highly trained research men who will gather scientifically the great mass of fundamental facts underlying the economic construction of modern types of highways. These data will be distributed among road builders in every state.

Many national bodies are actually coöperating with the Engineering Foundation and the Engineering Division of the National Research Council. Among them are the American Association of State Highway Officials, American Society of Testing Materials, Society of Automotive Engineers, Bureau of Public Roads, National Automobile Chamber of Commerce, American Society of Civil Engineers, American Institute of Consulting Engineers, American Society of Mechanical Engineers, Association of State Geologists, Western Society of Engineers, American Concrete Institute and American Automobile Association. Also the Engineering Departments of Columbia, Harvard and Yale, and the Universities of Maryland and Illinois, and Iowa State College.

The National Health Council

The need of coördination of the work of national voluntary health organizations has been appreciated for many years. Action to organize these activities resulted in a conference held in Washington on December 10, 1920, at which meeting a National Health Council was created. The membership includes the American Public Health Association, American Red Cross, American Social Hygiene Association, Council of State and Provincial Health Authorities, Council on Health and Public Instruction of the American Medical Association, National Child Health Council, National Committee for Mental Hygiene, National Organization for Public Health Nursing, National Tuberculosis Association.

It has been decided that the legitimate field in which the Council might function should include (1) a special information bureau, (2) a legislative bureau, (3) the coördination of health activities, (4) periodic joint conferences, (5) a statistical bureau, (6) the development of educational health material. It is anticipated that the financial resources of the Red Cross and other participants will be sufficient to enable the Council to establish an office and staff and to undertake first those activities promising the greatest benefit to member organizations and through them to the country at large.

Water-Supplies and the Typhoid Rate

The Massachusetts Method and a Warning in Reply

By H. W. Clark

Chief Chemist, Massachusetts Department of Public Health

DURING the last 35 years the typhoid fever death rate of Massachusetts has decreased from 45 per 100,000 inhabitants to less than 3 per 100,000 inhabitants, or, to be exact, 2.6. During the same period—namely, 35 years—public water-supplies in the state have increased in number from 110 to 213, and the percentage of population using these supplies from about 78 to 96. Furthermore, during this period many poor supplies have been abandoned, better supplies, including the Boston Metropolitan system, have been introduced, and more systematic and thorough guardianship of watersheds has been exercised. Undoubtedly the largest factor in the tremendous decrease in the typhoid death rate of the state has been the introduction of public water-supplies and the doing away with the use of contaminated well waters.

With the introduction of public water-supplies, sewerage systems have been installed in all the cities and large towns, and with these two modern conveniences, privy vaults and other like contrivances have vanished and the bathtub has brought about greater personal cleanliness. The old methods of caring for the sewage of a family not only continually polluted the domestic well waters in use, but caused the breeding of innumerable flies, which spread disease by contaminating milk and other food. In Massachusetts the discharge of the sewage of a municipality into a river used afterwards as a water-supply occurs in only one instance, namely, that of the Merrimac and its tributaries above Lawrence. Furthermore, greater watchfulness of state and municipalities over milk supplies and food in general has also been scientifically developed during the same period, each new reform in sanitation reacting favorably upon the others and greatly influencing the health and well-being of every community.

Typhoid fever epidemics due to the use of polluted water, contaminated milk and other causes have diminished rapidly, until to-day practically all typhoid occurring in the state is due solely to typhoid carriers. All health authorities agree, however, that a pure water-supply is the chief factor in controlling typhoid and that a polluted water-supply furnishes the greatest danger of a serious and widespread epidemic.

Filtration and Chlorination

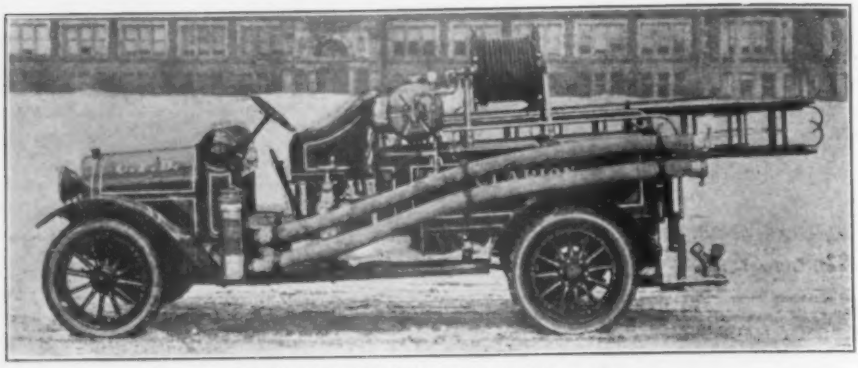
During the last 25 or 30 years two important methods of purifying water have been quite fully developed, namely, municipal filtration and the use of chloride of lime or liquid chlorine. The writer firmly believes in the value of filtration and urges filter installation strongly wherever a water-supply needs such purification. The value of hypochlorite or liquid chlorine has also been too well established to need much discussion here. As efficient as chlorine treatment is, the writer feels that it is not in the same class as a purification measure with adequate filtration, and should be considered solely as an adjunct.*

Throughout large sections of the country, especially where polluted river waters have to be used as municipal water-supplies, filters or chlorine treatment, or both, are absolutely necessary; and that filtration is an efficient method of eliminating water-borne typhoid, an enormous amount of reliable data collected during the past 25 years has absolutely proved. To be successful, filters must be of suitable construction, adapted to the water which they are filtering, and operated under good supervision; in other words, they must be designed by experts and operated under expert supervision.

At the present time it is understood that approximately 22,000,000 people in the country are using filtered water and that liquid chlorine or hypochlorite installations have been made in upward of 2,500 cities and towns. Massachusetts, however, has very few filters in operation and

* See Colonel George A. Johnson's discussion following this article.

Reliable Fire Protection



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few chlorine plants, yet it has the lowest typhoid fever death rate of any state in the country. Of the 3,700,000 people, more or less, within its borders using or having access to public water-supplies, about 400,000, or not over 11 per cent, use filtered water. Lawrence, Lowell, Newburyport and Springfield are the only cities and Brookline the only large town filtering their supplies. Of course, there are other filters, as at Middleboro, Reading, Cohasset, Norwood, etc., but the actual population of the state supplied in this way is comparatively small. Moreover, of the four large municipalities mentioned as filtering their supplies, only one—Lawrence—does so on account of bacterial pollution; Springfield filters to improve its water physically, and Lowell and Brookline to remove manganese and iron, as do a number of the smaller towns in the state. Only seven municipalities in the state have chlorine plants in operation all or part of the time, and one of these is Lawrence, which first filters its supply.

The policy of Massachusetts for the last 35 years has been to obtain for every city and town a water-supply that is safe and can be used for all domestic purposes without any purification treatment other than storage. The state has been almost phenomenally successful in accomplishing this. From the great metropolitan supply furnishing water to Boston and 20 surrounding cities and towns, down to the smallest supply, they are all practically safe at the present time, if we can judge from our typhoid fever death rate for the last few years.

Nearly 100 cities and towns in the state have ground-water supplies, and the remainder use surface water. The ground waters are taken largely from driven wells 25 to 59 feet deep, although many large curb wells are in use. These ground waters are, generally speaking, colorless, although there are a number of exceptions to this; they are usually soft, contain little organic matter, and many are equal to or better than the most famous or best-exploited New England spring waters sold at high prices throughout the country. They are all generally low in bacteria, and many of them often sterile when examined. Such waters are, of course, absolutely safe without filtration or chlorine treatment, and their introduction and use in so many cities and towns has undoubtedly had a great influence in lowering and eliminating typhoid in the state. They may perhaps be considered slowly filtered rain water. This water takes up in some instances slight amounts of organic matter when entering the soil, but this organic matter is eliminated or at least oxidized by the exceptionally slow filtration of the water on its way to the wells.

Now in regard to surface supplies the following can be said. Massachusetts is a thickly populated state containing 3,851,000 people, or 419 per square mile, and the population is increasing rapidly. This population is largely concentrated, however, in the eastern or metropolitan section of the state and along certain river valleys where water-power has been developed and railroad facilities are excellent. Large areas of the state contain no more inhabitants per square mile than one hundred years ago. These areas are frequently hilly and the rainfall high; their brooks, rivers and lakes contain an abundant supply of good water. These waters before use are practically all purified by storage, and such slight pollution as may from time to time occur on their watersheds has so far been almost invariably cared for by storage. They are low in bacteria when entering the supply systems, and the last water-borne typhoid epidemic in Massachusetts, due to a public water-supply, occurred so long ago that I doubt the possibility of its being easily recalled.

The following table gives the typhoid fever death rate of a large group of Massachusetts cities and towns aggregating 400,000 population using ground water-supplies, and a group of cities and towns totaling 1,500,000 people using surface water. Included in the surface-water group are Boston and a number of other cities and towns using the metropolitan water. These figures are for the ten years 1910 to 1919 inclusive.

Examination of the table makes clear that the two groups of municipalities have about an equal number of deaths yearly from typhoid fever per 100,000 people. There is no question that the ground water-supplies included in this table are absolutely safe. Bacterially they average better than the best filter effluents, and it goes without saying that if they are safe

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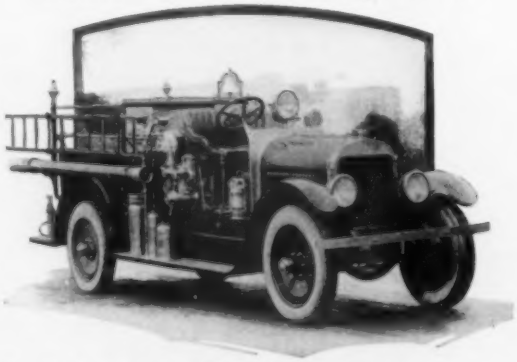

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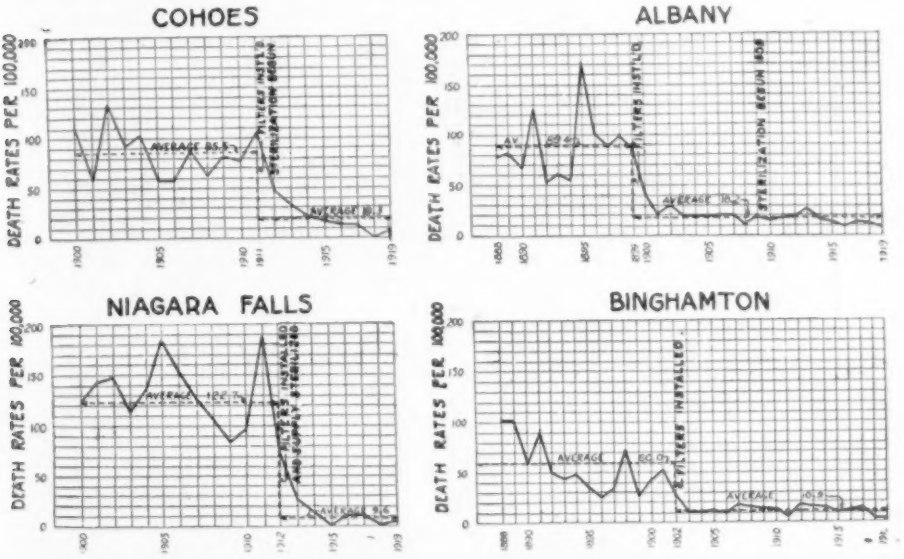
TYPHOID FEVER RATE PER 100,000

Municipalities with—	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Surface water-supplies.....	12.9	8.9	8.0	9.1	8.6	6.0	3.5	3.6	3.2	2.6
Ground water-supplies.....	12.9	6.6	8.1	4.5	8.1	8.9	6.7	2.8	2.4	3.0

the towns receiving surface water-supplies and showing typhoid death rates as low are receiving equally good and safe water. That is the story of Massachusetts to-day in regard to safety of water-supplies without filtration and without chlorine treatment, except in the few instances I have mentioned.



DIAGRAMS SHOWING THE REDUCTION IN TYPHOID RATES IN CITIES OF NEW YORK STATE AFTER THE INSTALLATION OF FILTERS AND STERILIZATION

A Discussion of Mr. Clark's Paper

By Colonel George A. Johnson

IS it practical, is it possible, to maintain a surface water-supply in a state of natural purity? There is no debate, it is not. All surface water-supplies, including those of Massachusetts, are open to dangerous pollution at all times. Where there are growing communities there will always be dangerous wastes produced by such growths. No man or group of men can be depended upon to so care for those wastes that they will not in part somewhere, sometime, pass into the waterways which drain such polluted areas. And always there is the potential danger that the water-supplies derived from such watersheds will sometime, somehow, become incidentally or accidentally polluted with disease germs.

The writer does not feel that Massachusetts is doing all that sound sanitary logic dictates. She has an enviable record respecting water-borne diseases, brought about largely through the efforts of the State Board of Health in setting up lines of primary prevention, but she ignores such sure secondary and tertiary lines of defense as filtration and sterilization where such expedients are not positively demanded by the known gross pollution of the raw water-supply. Every state, every city, must avail itself of all modern safeguards in order to insure for all time an

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adequate protection against the ravages of water-borne epidemics.

All surface waters untreated before public consumption are potentially dangerous. All the efforts and good intentions in the world cannot eliminate the possibility that sometime a typhoid carrier, perhaps among the watershed patrol, or a chance traveler over the watershed, or a leaky or overflowing cesspool or other point of deposition of the excrement of the inhabitants, or an isolated farmhouse in which there is typhoid fever in incipient, active or chronic form, may contribute poison to a public water later used for human consumption, and cause typhoid fever in the consumer. It is a matter which is uncontrollable except through the exercise of diligence and uniformity of application in setting up such secondary and tertiary lines of defence as filtration and sterilization of all surface waters. Failure to recognize the soundness of this logic, which is founded on indisputable proof and past experience, may result in a repetition in Massachusetts of the typhoid history of Plymouth and New Haven, where the water-supplies taken from watersheds but sparsely populated became suddenly and "accidentally" contaminated from one case of typhoid, and epidemics promptly followed.

The writer must be understood as in no wise attempting to belittle the truly remarkable health record of Massachusetts. It is an accomplished fact and susceptible of no criticism other than this: in public health matters one must not stand still or, in other words, stand on a good record of the past. The potentialities of the present and the future must be jealously regarded lest the public health suffer.

Where the public health is at stake, reasonable money expenditures are, or should be, no object, and the evidence is conclusive that any amount of money spent for pure water, if it prevents typhoid fever, is money well spent. The balance is always on the right side of the ledger. Parsimoniousness in such matters or adherence to what the writer considers a "part-way" policy, cannot be justified on any ground other than a mistaken idea of economy.

Are You Organized for Emergency Relief?

Should there be a fire of great magnitude, an explosion, a serious subway accident or any similar disaster in New York City at any time, several thousand trained volunteers are ready to report for duty on a moment's notice. Organized into an emergency unit by the New York County Chapter of the Red Cross, these trained nurses, ambulance drivers, canteen workers and first aid workers are equipped and ready to handle 10,000 casualties a day.

Large supplies of surgical dressings, garments of all sorts, operating equipment, litters and cots lie in the Red Cross warehouse, in readiness for immediate transportation. Day and night the garage, housing nineteen Red Cross ambulances, is open, and a garage force of seven men keeps the cars in constant repair for use in transporting possible disaster victims to the hospitals. There are four drivers on regular duty and an unlimited number of women of war-time motor corps experience who are ready to be called on in case of emergency.

The stock of canned meat, condensed milk and coffee stored in the canteen is sufficient to supply a small city. The canteen corps has equipment for making 600 gallons of coffee in 40 minutes and can serve 700 persons in 5 minutes.

The disaster relief unit has already been called on for service many times—the most notable being the Wall Street explosion. A Red Cross truck, loaded with first aid supplies, arrived on the scene twenty-five minutes after the disaster occurred.

This is what New York City has done. Every city, town and village in the country, through its local Red Cross chapter or other organization, should in some similar manner be prepared to give immediate relief to sufferers in case of emergency.

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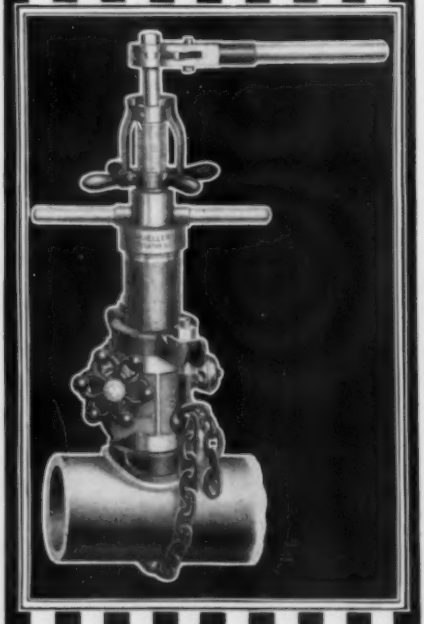

Drainage to Combat Malaria Fever

By George Parker
Sanitary Engineer, International Health Board

AT the present time sanitary engineers representing national, state and local health organizations are busy combating malaria. It is essentially an engineer's problem through the necessity of destroying the breeding areas of the Anopheles mosquito.

What causes malaria fever? An organism or germ that is introduced into the blood through the bite of the female Anopheles mosquito, which obtains the germ by sucking the blood of a person sick with the disease. It follows that even if we have these mosquitoes, and there is no person in the neighborhood ill with malaria, the mosquitoes cannot obtain the infection to spread the disease; or, even if infected persons are present, if there are none of this species of mosquito to transmit the disease, malaria will soon die out. But we have both—the infected people and the mosquito, and the latter is ever busy transplanting the germ of infection.

Mosquitoes breed only in water, the slow-moving stream with irregular banks, swamps, ponds with grass-grown edges, etc., forming the selected areas for the Anopheles or malaria-carrying mosquito to breed in. Through the elimination of these places the mosquito is destroyed, and consequently the transmission of malaria ceases. This is only one of the methods employed in controlling the propagation of this kind of mosquito, but it unquestionably ranks first in importance, and is most satisfactorily and economically handled by the engineer.

Besides freeing a community of malaria fever, the removal of the water from swampy sections uncovers tracts of land for cultivation or other use, which would otherwise have remained a menace to the community.

As swamps form on the lowlands, it is very often found that extensive and extremely accurate drainage systems must be constructed to relieve them, for they must be drained absolutely dry to gain the desired result, and such systems must be so constructed as to function properly in years to follow.

The Use of Fish in Combating Mosquito Breeding

In a report by G. W. Park, Inspector, Bureau of Sanitary Engineering, Texas State Board of Health, he states that the Bureau has found the fish "Gambusia Affinis" a wonderful help in abating mosquito breeding, thus aiding in anti-malarial work. This fish is the minnow commonly known by fishermen as the "pot belly." The species has no general outstanding external markings. It possesses the combined features of the several top-minnows and thus is hard to distinguish without becoming thoroughly familiar with live specimens.

The average length of the female is about 2 inches, and that of the male is about 1¼ inches. It feeds at the surface and subsists principally on insect larvae. It is very vigorous and hardy and does well when subjected to different changes in natural conditions. They are very prolific, easily propagated and reach areas not inhabited by any other species. They have an exceptional devouring capacity, and their general habits lead them to live in the identical areas where the mosquitoes breed.

The Gambrusia Affinis as a control measure may be applied to such areas as stock ponds, watering-troughs, surface reservoirs and the like where oiling and draining is impracticable. To obtain the best results, the water area to be treated should primarily be conditioned favorably for natural propagation of the fish. These conditions include:

1. Clean edges and surface free from débris and floating vegetation
2. Sufficient clear, shallow edges to provide protection against game fish when present
3. Sufficient vegetation on bottom of area, to reduce artificial feeding to a minimum
4. General attention and occasional feeding when needed
5. Exclusion of unnecessary disturbances, especially in small areas

In introducing the work in a community or municipality, a hatchery may be designated and established. This should be encouraged for educational and demonstration purposes. Great care should be exer-

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PRODUCING AND REDUCING THE MALARIAL MOSQUITO

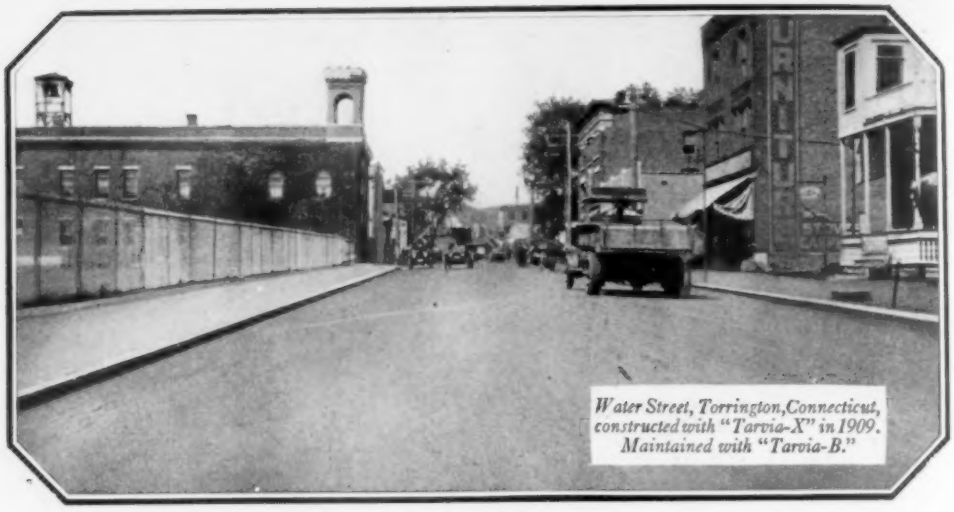
Upper left—Concrete spillway acting as dam. Back water at upper end of lake forms swampy areas producing anopheles. Lower left—Swampy condition mentioned above, which was relieved by diverting a small stream to pass through the area and gradually filling in by silt carried down stream during rains. This area could not be drained without lowering the concrete spillway, hence the method described was used. Right—Drainage system being constructed through area that for years remained water-soaked and a breeding-place for anopheles

cised in collecting and distributing the fish. The required number to stock an area depends entirely on size, condition and time. Several thousand impregnated females are considered sufficient for an average pond of about 10,000 square feet surface area, stocked in the early spring. Typical food consists of bread crumbs, minced liver or fish, and yolks of boiled eggs.

At the present time the Bureau of Sanitary Engineering of the Texas State Board of Health is making a test of the length of time this fish can live without food and its adaptability to stale, stagnant water. On September 1, 1920, six of the fish were placed in an aquarium. Since that time they have not been fed nor has the water been changed. One died when they were first placed in the aquarium, and the other five have continued to live and are hardy. This is considered a very good demonstration of the fact that they will survive even under most trying conditions and will hence aid mosquito extermination.

Banner for Best Milk in New Jersey

The *Montclair Herald*, Montclair, N. J., reports that as a feature of the State Farmer Week exhibit at the Second Regiment Armory, Trenton, N. J., the city of Montclair won the right to fly the State Championship Banner for the best milk served to consumers in its community in the state-wide dairy market competition. This competition has greatly interested health officials, civic societies and consumers associations, and many cities have awaited with interest the result of the scores. Montclair's score in the raw milk class was 93.3, said to be the highest ever obtained by a New Jersey community. Newark scored 78.4 and Atlantic City, 77.7, both of which are considered as high records.



Water Street, Torrington, Connecticut, constructed with "Tarvia-X" in 1909. Maintained with "Tarvia-B."

A Tarvia Pavement— ten years old and still new—

THE Tarvia road above is Water Street, Torrington, Connecticut.

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Torrington is a busy manufacturing town where there is plenty of heavy traffic, and its satisfactory experience with Tarvia may be taken as typical. Whenever Tarvia is given a fair trial it invariably makes good. And the fact that towns which once begin to use it continue using it in increasing quantities year after year, is the finest kind of endorsement it could have.

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Validity of Garbage Ordinances

Right of City to Control of Garbage Is Paramount to Property Right of Owner Thereto

By A. L. H. Street

THE right of the housewife to convert the remnants of Sunday's pot roast into hash remains inviolate under the decision of the Michigan Supreme Court in the case of Pantlind vs. City of Grand Rapids, 177 Northwestern Reporter, 302. But the same decision shows that the municipality has something to say as to what becomes of the remnants of the hash. In short, no constitutional right exists in the possessor of garbage to feed it to the family porker being fattened in the private piggery at the rear of the home, nor to market it at personal profit to some one who may desire it as provender for his swine, as against the right of the municipality to promote the public health by taking unto itself the matter of disposing of refuse. The same reasoning is applied to hotels, restaurants and other wholesale producers of garbage.

A similar conclusion is reached by the Utah Supreme Court, and both that tribunal and the Michigan Court refer to a decision of the United States Supreme Court as supporting their conclusions.

In the Michigan case, plaintiff sued to enjoin the defendant from enforcing a garbage disposal ordinance to his prejudice in being prevented from using the garbage produced at his hotels in feeding swine and poultry at his farm several miles distant. The Trial Court ordered an injunction, but the Supreme Court reversed the decision.

The ordinance authorizes the local Board of Health to contract with some suitable person or persons to provide proper tanks for the reception of garbage, to collect the garbage and dispose of it, under regulations adopted by the Board. Transportation of garbage, dead animals and other unsanitary matter through the streets, excepting by licensed persons, is forbidden.

Other caterers were permitted to join in the suit as plaintiffs, and the evidence showed that cleanliness characterized the keeping and handling of their garbage. In part, the Supreme Court says:

"As to the right of plaintiffs to those wholesome substances, leavings of the kitchen or table, which are fit for food, we quote from the [case of] city of Grand Rapids v. De Vries, supra:

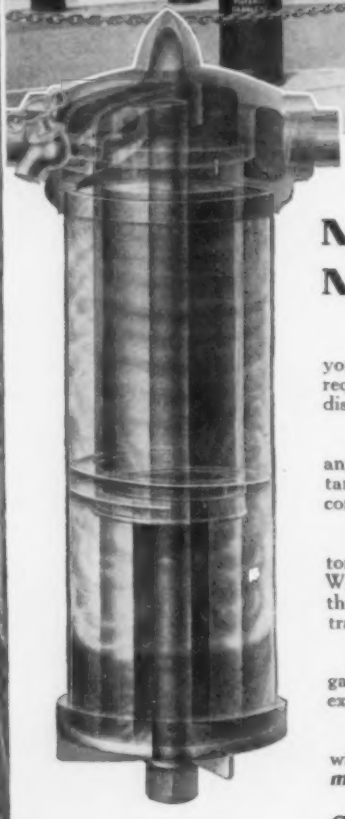
"'. . . It may be said that the ordinance does not attempt to regulate in any manner whatever the disposition of wholesome substances by the householder. It is aimed only at refuse; that is, discarded, worthless matter—matter unfit for food. The householder has perfect liberty, under the ordinance, to consume, or to sell or give away, all the leavings of his table or kitchen that are fit for food.'

"The above language plainly implies that the city in the exercise of its police power had the right to treat as a nuisance all such refuse as is unfit for human food. . . . Wholesome substance may be distinguished from garbage upon the facts of a given case; but, generally speaking, they may include broken bread, meat trimmings, vegetable parts, specked apples, and the like, if fit for food. . . . But when such matter is mingled with garbage it becomes subject to public control. . . .

"It is urged that a person who has produced garbage upon his premises has a right to dispose of it and to convey it through the streets, because it is property of value and that as to him the ordinance is wanting in due process of law required by the Constitution. Upon this point several dead-animal cases, so-called, are cited, but these are not controlling. It is not competent to declare a dead animal to be a nuisance immediately after death. . . . Dead animals are not nuisances in themselves, and the city in its ordinances must pay a proper regard for the rights of the owner on such property."

The Court then proceeds to quote the following language used by the United States Supreme Court in the case of Gardner vs. Michigan, 199 U. S. 331, 26 Sup. Ct. 108:

"Touching the suggestion that garbage and refuse are valuable for the manufacture of merchantable grease and other products, it is sufficient . . . to remark that it was a controlling obligation of the city, which it would not properly ignore, to protect the health of its people in all lawful ways having relation to that object: and if, in its judgment, fairly and reasonably exercised, the presence of garbage and refuse in the city, on the premises of householders and otherwise, would endanger the public health by causing the spread of disease, then it could rightfully require such garbage and refuse to be removed and disposed of, even if it contained some elements of value. In such circumstances, the property rights of individuals in the noxious materials



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More Miles

The smallest particle of water in gasoline will give you carburetor and engine trouble. Motorists should require the extraction of all water before gasoline is discharged into the automobile reservoir.

When gasoline is drawn from a storage tank by any process, a like volume of air is forced into the tank by atmospheric pressure. Its moisture content is condensed, forms water and mixes with the gasoline.

The Bowser Patented Centrifugal Water Separator is located on the discharge pipe of the pump. Water, being heavier than gasoline, is separated by the whirling motion of the separator and the water is trapped in the separator.

After passing through a wire cloth strainer the gasoline, pure and full of power, is discharged, without exposure to the air, directly into the car.

Bowser Piston Type Measuring Pumps for gasoline will assure you ***better carburetion, more power, more miles per gallon.***

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S. F. BOWSER & COMPANY, Inc.

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described in the ordinance must be subordinated to the general good."

In the Utah case—Salt Lake City vs. Bernhagen, 189 Pacific Reporter, 583—the Supreme Court of that state reaches similar conclusions under a similar ordinance, against a contention made on the part of defendant that "the enforcement of the ordinance by the municipality is not destroying property in the interest of health, but the effect is to take property of value from one and give it to another; that if the garbage, refuse, etc., is dangerous to health, and therefore a nuisance in the hands of the owner, it will continue to be deleterious to health and therefore a nuisance when delivered to and taken into the custody of the municipality or its exclusive contractor; that the city can only justify depriving the defendant of property, or the property of his employer, after showing its deleterious nature, and by showing further that it is taken with the intent and purpose of destroying it, or in some way removing the part found injurious to public health."

Community Leaders Will Study European Cities

Tour for Business and Professional Men and Women

AN unusual tour of Europe for the purpose of observing business, social and economic conditions is planned for business men, chamber of commerce executives, municipal officials, and other civic leaders during the summer of 1921. Although the usual objects of interest to tourists will not be neglected, the purpose of the trip will be to put representative Americans in close touch with the active current life of England and the Continent. The executive head of the party is Dr. John Nolen, city planner, whose work is familiar to all readers of THE AMERICAN CITY. It is hoped that in each city visited there will be an opportunity to meet the leading local exponents of civic, economic and industrial affairs.

In Great Britain, London, Birmingham, Liverpool and Edinburgh, will be visited with especial emphasis on the manner in which England is meeting the housing problem, and an opportunity to see such garden cities as Letchworth, and Lord Leverhulme's interesting model community at Port Sunlight. Belgium will be visited next.

This will be the first group of representative business and professional men to make such a tour of the Central European States since the war. Germany once had a great deal to teach us in the matter of civic and social administration. Her people are eager to resume business relations with us. There will be ample opportunity to see how the German people are meeting their after-the-war problems in Berlin, Dresden, Munich, and the iron-coal region about Düsseldorf and Essen. Fourth of July will be fittingly observed with the Army of Occupation at Coblenz on the Rhine.

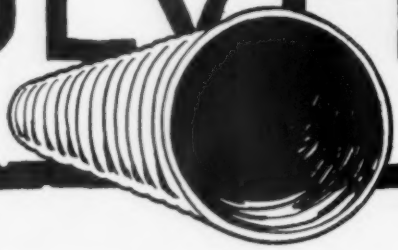
Two days will be passed in Vienna, the most hopeless capital in Europe; and two in Prague, the capital of Czecho-Slovakia, the new state that is making such rapid strides in the reconstruction of its civic and industrial life. Then to Milan, where centers the interesting industrial experiment in the control of factories by the workers. This situation will be interpreted on the ground by a competent Italian authority, after which the party will turn north to Berne, Lucerne, and Geneva, the meeting-place of the League of Nations.

The end of July will bring the party to Metz and "American France"—St. Mihiel, Verdun, the great cemetery at Romagne, the Argonne, Rheims and Chateau Thierry. The greatest battlefields in history will be visited before time has obliterated the marks of the conflict; another summer, and the "devastated areas" will be superficially restored to their normal life. The tour will come to its conclusion with four days in Paris.

Although the itinerary has been arranged with a view to meeting the interests of men, women will be welcomed and their interests provided for, as it is recognized that women are taking a constantly increasingly active part in American civic life.

Full information may be obtained from A. E. Bailey, of the Intercollegiate Tours, 65 Franklin Street, Boston, Mass.

NEWPORT CULVERTS



Serviceable for every Service

Whether used in the city street, the country road or state highway, Newport culverts give dollar for dollar service. In all the years we have been making these durable culverts, we have yet to receive a complaint regarding unsatisfactory or defective service. However, we have received dozens of letters complimenting us on the merits and the lasting qualities we have put into our products

NEWPORT CULVERTS ARE MADE FROM GENUINE OPEN HEARTH IRON. GOVERNMENT TESTS PROVE THEM 99.875 % PURE IRON, COPPER ALLOY, ABSOLUTELY RUST-RESISTING

DON'T FORGET TO LAY NEWPORT CULVERTS NEXT TIME. ONCE LAID, YOU CAN FORGET ABOUT THEM.

SEND YOUR ADDRESS FOR FREE BOOKLET

NEWPORT CULVERT Co

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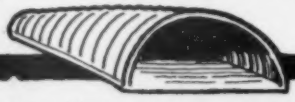

Municipal Finance

BONDING ACCOUNTING TAXATION

Proper Publicity for Municipal Bond Offerings

By Sanders Shanks, Jr.
Editor of The Daily Bond Buyer of New York

IN the course of a normal year, the states, counties, cities, villages and taxing districts of the United States sell about five thousand issues of bonds aggregating from four hundred to seven hundred millions of dollars. These issues range in size and importance from the one-thousand-dollar paving loan of a small Ohio village to the fifty-million-dollar corporate stock issue floated by the city of New York for the building of new subways. From Canada to Mexico and from Maine to California, every state is represented in this long list of borrowing for the building of roads and bridges, schools, court houses, jails, waterworks plants, fire department buildings, electric light and power plants, public market places, sewer systems, parks, etc.

State and municipal bonds, considered from an investment standpoint, constitute one of the highest-grade American securities, second only to United States Government bonds. Carefully guarded by constitutional and statutory provisions, these securities enjoy the confidence of the most conservative investors in the country. It is a well-recognized fact that there is always a demand for municipal bonds, regardless of factors which oftentimes make it difficult for other classes of borrowers to obtain accommodations.

Public Sale Method of Bond Selling

When a city issues bonds it must consider among other things the problem of disposing of those bonds. The law governing the creation of municipal indebtedness usually requires that bonds be sold at public sale. In some cases municipal officials are permitted to choose their own method of negotiating the sale of the bonds, but as a rule the law requires that sealed bids be invited and the bonds be awarded to the highest bidder. This is simply an application to the sale of bonds of the same rule that is almost universally followed by state and local governments in purchasing supplies of all kinds. "Public letting" or "Public bidding" is recognized as the only guarantee of competition and the only competent safeguard to protect the public treasury against overcharging or other forms of graft in the dealings of the municipalities with contractors, merchants, etc.

The private sale of bonds (and a public sale ineffectively advertised is virtually a private sale), except in very unusual and infrequent instances, was long ago condemned by most states as unsafe and costly to the borrowing municipality, and is discouraged by the largest and most representative bond dealers. This method offers to the unscrupulous buyer of bonds an opportunity to purchase bonds considerably cheaper than they could be bought at a public sale where the element of competition is present. It is not an exaggeration to state that thousands of municipal bond issues have been purchased in this manner at prices representing far less than their true market value, because of the absence of competitive bidding and the ignorance of officials with respect to bond values.

The problem which the city official charged with the duty of marketing a bond would do well to consider is that of attracting to his bond offering sufficient attention among bond buyers to assure a number of bids submitted in actual competition. It would, of course, be a difficult task for a small town or city to reach the thousands of wealthy investors, saving banks, trustees,

DOW Calcium Chloride Flake
Preserves Gravel and Macadam Roads

What wears out macadam or gravel roads?

Small *loose* particles are blown away as dust—they are pulled away by the vacuum created by rapidly moving wheels.

Every time a layer of dust raises, every time tiny particles are thrown or washed away, still another layer is exposed to the disintegrating action of traffic and the elements until the road surface is broken down.

Dow Calcium Chloride Flake binds the small particles together so that each is held by its neighbor in a vise like grip. The Calcium Chloride takes sufficient moisture from the air to retard the dusting away.

Dow Calcium Chloride Flake provides the binding properties lacking in dry gravel, aids packing, retains moisture, provides adhesion of one particle to the other. It makes a dense, hard, long wearing surface.

The Michigan State Highway Department, after thorough research on binders and dust preventives for gravel and macadam, have used and are using thousands of tons of Calcium Chloride on graveled trunk roads.

Dow Calcium Chloride Flake is made on the same precise accurate basis as are the vast quantities of other chemicals produced in the Dow plant which covers more than one hundred thirty-five acres of ground and employs more than one hundred graduate chemists and internationally famous research men.

If you would make a reputation for low cost road maintenance and longer lasting roads, let us discuss with you by letter at once, the value of Dow Calcium Chloride Flake for your particular road problems, whether on trunk roads or in parks, cemeteries and private estates where dust prevention is a problem.

The Dow Chemical Company

Midland, Mich. **U. S. A.**

insurance companies, fraternal orders, sinking funds, and other buyers which constitute the broad market always existing for municipal bonds. But this is not necessary, even were it advisable or even practicable.

The Municipal Bond Dealer

Scattered throughout the country, but with their offices in twenty or thirty of the principal cities, there are a few hundred investment banking firms or companies which make a business of buying municipal bonds and reselling them to investors. Sometimes these dealers operate in a restricted territory, specializing in bonds originating in a single state, while others, maintaining offices in a dozen cities, deal in bonds issued throughout the country. They purchase the bulk of all state and municipal bonds sold, and, because of their ability to resell them in the market where they will bring the highest price, they are in a position to make the municipality the best bid.

But these dealers cannot bid for the bonds of a city unless they are advised that the city has bonds to sell. And they cannot read the local newspapers printed in every little community in the United States In order to find out when and where bonds are to be sold. And so, the problem of the borrowing city resolves itself into the simple matter of getting in touch with a comparatively small number of well-known and easily found specialists who will bid in competition for its bonds and take them at a price representing the real value of the securities in a market as broad as any market in the world.

These specialists in municipal bonds may be reached through the medium of financial newspapers, especially those publications which make a specialty of publishing bond news and official advertisements of municipal bond offerings. Because of the peculiar nature of this business, the municipal bond dealer must rely upon such publications to collect news of bond offerings for him, and so he becomes a regular and careful reader of the best of such newspapers.

Experts Agree on Public Sale and Bond Dealer Advertising

In a booklet distributed a few years ago among municipal officials by a prominent Baltimore banking house, T. Stockton Matthews, a municipal bond dealer of wide reputation, says:

"It pays to advertise in selling bonds as well as other commodities. While there are some exceptions when a private sale of securities will net the best price, yet, as a general rule, those issues which are intelligently and systematically advertised for sale will be most profitably and creditably placed. The best, and in fact the only suitable, medium for such advertising is the standard financial journals and magazines which have among their subscribers practically all of the active and reliable dealers in municipal bonds in this country. The advertisements which are inserted in these columns are carefully and closely scanned."

Few States Recognize Importance of Proper Bond Advertising

Strange as it may seem, but few states require by law that notices of bond sales be published in financial papers. The general rule is that a city publish its bond offering notices in the same local newspapers in which legal notices of interest only to local people are inserted. This sort of publicity is, of course, largely ineffective in reaching bond buyers located outside of the community reached by these local newspapers.

The municipal bond lawyer, through whose hands hundreds of issues of bonds pass, has come to be regarded as an expert on the procedure and practice incident to the issuance and original sale of municipal bonds. He is in an excellent position to note the results of the many different methods employed by municipalities in various sections of the country in the negotiation of bond issues, and is consulted more and more each year by municipalities for advice with respect to the proper way to go about the marketing of securities. The recommendations of several of the most prominent of these bond lawyers has a proper place in this discussion. L. L. Delafield, Jr., of the firm of Hawkins, Delafield and Longfellow, of New York, says:

"Advertising in a local newspaper of a small municipality is of very little use in obtaining bidders for bonds. It may be justified to require such advertising in order to give the citizens of the municipality knowledge of the fact that its officers propose to hold a sale, so that the citizens may attend to see that all goes well, but bids are not obtained in this way.

"In order to obtain bids for municipal bonds, there is no better method than to publish the notice of sale in one of the financial papers that specializes in this class of advertising. I have known of individual cases where the delay incident to a public sale in a falling market has cost the municipality money, but in the long

A Financial Service For the Municipality

We are prepared to inform municipal officials regarding

1. Present cost of raising money
2. The most desirable method of financing

Our municipal department handles state, county and municipal bonds representing over thirty states in the union. Our experience and facilities are at the disposal of any municipality.

Correspondence invited

A. B. Leach & Co., Inc.

Investment Securities

62 Cedar Street, New York

Chicago Philadelphia Boston Buffalo Minneapolis Baltimore Pittsburg Cleveland

The „Minerva" Fountain Ruling Pen

Will do a whole day's work with one filling.

You can concentrate on your work—use any kind of ink—will not leak or blot. Guaranteed to operate satisfactorily.

Price only $5.00 Postpaid—ORDER TODAY!

KOLESCH & COMPANY, 138 Fulton St., New York

Friedman "Snow-Loader" Revolutionizes Snow Fighting

This machine will positively handle your snow removal at a saving of 90 per cent over any other method now in use. The Friedman "Snow-Loader" has been used in New York City with unbounded success and satisfaction, loading trucks of 8 cubic yards capacity, at an average speed of 60 seconds. If these statements interest you, it will pay you to write for further information concerning the most efficient snow-fighting machine yet developed.

NATIONAL SNOW REMOVING CORPORATION **67 East 93rd St., New York City**

run I am satisfied that the best policy requires a public sale. The financial papers are searched daily by all the bankers and investors who are interested in purchasing at the sales held by municipalities. Competition is keen, and a sale after advertisement in such a paper, in the vast majority of cases, will bring the best price obtainable."

We may also quote the firm of Caldwell & Raymond, of New York, as follows:

"There can be no question that better results will be obtained from advertising original offerings of municipal bonds in financial publications than from advertising them in newspapers of general circulation, whether the latter have only a local circulation or a general one. Practically all such original offerings are sold to dealers, bids, if any, received from private investors being in most cases out of line with market conditions."

Another municipal bond attorney of note, Robert R. Reed, has advocated, as attorney for The Investment Bankers Association of America, the public sale of municipal bonds. Mr. Reed says that a mandatory public sale provision for municipal bond sales "seems to be gaining in favor and is generally desirable from the municipality's standpoint. We practically always advise a public sale when our opinion is desired by the municipality."

A convincing argument in favor of advertising original municipal bond offerings in financial publications is made by Chester B. Masslich, of New York, a bond lawyer who has been associated with the municipal bond business for a great many years. Mr. Masslich says:

"Excellent reasons are responsible for the fact that the ultimate investor is rarely a bidder at original sales of municipal bonds, but prefers to buy them from an investment house which has first placed its own money in the bonds and investigated their worth. It is therefore to the investment houses that municipalities must look. A journal devoted to current municipal bond news naturally goes into the executive offices of all these investment houses, and every advertisement in its columns becomes immediately known to these houses."

New Jersey's Public Sale Law

In recent years the New Jersey Legislature has made an intensive study of the whole subject of municipal finance, which has resulted in the passage of the "Pierson Bond Law." (Chapter 252, P. L. 1916, as amended.) Under this modern statute, New Jersey municipalities are financing themselves in the most modern, businesslike and economical manner, and the Pierson Law is recognized as a model by other states which are endeavoring to modernize their bond laws.

Arthur N. Pierson, author of the law referred to and a keen student of public finance, states in a letter to the writer:

"I am convinced that all bond sales should be advertised as widely as possible; especially in such financial papers as reach the bond dealer and investor. Through such mediums alone can we hope to get true competitive bids on our offerings."

The viewpoint of the experienced city treasurer should be of interest in this discussion. Here is the way City Treasurer R. N. Young, of Salt Lake City, sizes up the proposition:

"It is an old saying that if you want to get money you go where money is, and I cannot conceive any corporation or municipality undertaking to dispose of securities without availing themselves of the services of a medium of advertising that reaches the class of people and interests they must reach if they are to dispose of their offerings."

Encouraging Market for Municipal Bonds

The opening month of the year has seen the successful floating of several important municipal bond issues. Detroit offered two lots, one of $35,000,000, and the other of $10,126,000. This was closely followed by the sale of $11,455,000 4 per cent bonds by the city of Chicago, at a slightly lower figure than that obtained by Detroit.

During the same week Cleveland disposed of $5,000,000 School District 6's, and Akron of $2,000,000. Other interesting issues of the month included $4,225,000 by Rochester, N. Y., and $5,000,000 by Philadelphia.

The ease with which these issues have been disposed of has been distinctly encouraging, and while it is not anticipated that there will be any rapid movement in prices, the market is regarded as stong enough to absorb any offerings likely to be made in the near future.

Cletrac Keeps the Streets Clear

THE tank-type Cletrac is being used in many towns throughout the country to keep streets clear of snow and slush. It works equally well pushing a snow plow or pulling an ordinary road scraper.

Cletrac's broad sharp-cleated tracks take it easily over ice and snow on hard or dirt roads.

This tractor has the certain traction and abundant power needed to keep it working steadily right through the worst storms of winter.

Ask your local Cletrac dealer for a demonstration and write us for further facts about Cletrac in municipal work.

SPECIFICATIONS

Horsepower: 12 at drawbar, 20 at belt-pulley
Length: 96 inches
Width: 50 inches
Height: 52 inches
Weight: 3420 pounds
Turning Circle: 12 feet
Traction Surface: About 800 sq. in.
Center to Center of Tracks: 38 in.
Belt Pulley: Dia. 8 in., face 6 in.

Cletrac
TANK-TYPE TRACTOR

THE CLEVELAND TRACTOR CO.

"Largest Producers of Tank-Type Tractors in the World"

19205 Euclid Ave. **Cleveland, Ohio**

News and Ideas for Commercial and Civic Organizations

Golf Club Financed by Marion Chamber

MARION, OHIO.—The financing of a country club house and a nine-hole golf course is a recent accomplishment with which the Marion Chamber of Commerce is much pleased. The need of these recreational facilities had been discussed by the organization for years, and committees had been appointed to establish them but were always later disbanded because of their inability to get results. The difficulty appeared to be that a division of opinion existed as to the proper location of the course.

Another attempt to launch the project was made a year ago, when it occurred to one of the Chamber's officers to attempt to prevail upon the chairman of the Civic Committee to spend several days at one of the southern winter resorts and become an enthusiastic golfer. The young man did so, and that act "turned the trick." Upon his return he called a meeting of his committee, at which it was decided to gather all the young men of the community together at an early date and secure their coöperation in launching the project.

Country Canvassed for Site

Before these young men were called together, however, and in order that the disappointing experiences of former meetings held for the purpose might be avoided, a canvass was made of all the surrounding territory by three or four experienced golfers in search of a suitable site. One containing 120 acres was found to be available and an option was taken on it, one of the young men giving his personal check to secure it. Two or three other men were then authorized to prepare an organization program and have it ready for the proposed meeting. The program was adopted, with a very few minor changes, at the first meeting of these young men. One committee was promptly appointed to purchase the real estate, and another committee to set in motion an intensive drive for members.

A holding company and an operating company were then formed. The Marion Country Club Holding Company was capitalized at $50,000, and holds title to the real estate, which it leases to the operating company, the Marion Country Club Company. The stock has a par value of $100, bears 6 per cent interest and is non-taxable. The sale of stock was made possible by the large subscriptions which were taken by several of the prospective members of the club, some of whom took as much as $3,000 worth. The stock was offered at 6 per cent in order to make it an attractive investment.

Securing the Money

It was necessary later to increase the capitalization to $75,000, because $50,000 proved to be insufficient to establish a first-class country club. The sum of $33,000 was paid for the site; it was estimated that it would cost at least $30,000 to erect and equip the club house, and the building of the first nine holes of an 18-hole golf course would cost $15,000. Even with the capitalization at $75,000, this left a deficit of $3,000, and so, in order not to entirely deplete its resources, the holding company gave a mortgage on the real estate for $10,000, holding in reserve a sum of money to take care of incidental expenses. The operating company will take over the Country Club when it is ready, and will pay therefor a rental equal to 6 per cent of the money invested by the holding company in the property, plus taxes and insurance. The holding company and the operating company are almost entirely distinct from each other in the matter of their personnel.

Golf playing will begin early in the spring, with nine holes prepared under the supervision of a well-known golf architect. In addition to the yearly dues of $75, each member of the Country Club will be required to own at least one share of stock in the

Standard Municipal Equipment

The Mack truck has become practically standard for the heavier classes of municipal trucking.

For the reason that Mack construction is more than adequate in every detail for requirements which overtax those trucks whose safety factors are low.

A large number of recent installations have been for street flushing and sprinkling. The Mack combination flusher and sprinkler embodies several fundamental advantages. Chief among them are single engine system; plenty of power for truck and pump—low operating and maintenance costs—one man operation.

Our engineering department will be glad to consider specific problems of municipal equipment and make unbiased recommendations covering them. An inquiry does not incur the slightest obligation.

INTERNATIONAL MOTOR COMPANY

New York

Capacities 1½ to 7½ tons **Mack TRUCKS** **Tractors to 15 tons**

"PERFORMANCE COUNTS"

When writing to Advertisers please mention THE AMERICAN CITY.

operating company. Non-members may also purchase stock in the operating company if they wish. The dues were placed at this high figure to enable the operating company to pay the interest on its stock, as well as to provide a fund with which to maintain the golf course.

The membership has been restricted to 300. Members resigning from the Country Club are required to surrender their stock to incoming members who may be accepted in their places. The stock certificates contain a clause binding members for the payment of the unpaid house bills or dues.

The purpose of restricting the membership to 300 was to make sure that the playing members would always be able to use the course, because an 18-hole golf course will accommodate only a certain number. That number really provides quite a narrow margin, but since this golf course is the only one in the city, it was necessary to allow a slightly larger number of players access to it. The Chamber of Commerce feels that a country club of this character is an undoubted asset to a city because of the opportunity it affords the younger men of the community to get together for wholesome social affairs and participate in healthful recreation, which should make them lose interest in the less wholesome attractions of the larger cities.

HARRY F. PALMER,
Executive Secretary, Marion Chamber of Commerce.

Chicago Safety Council Teaching Accident Prevention

CHICAGO, ILL.—The Chicago Safety Council, recently incorporated under the laws of Illinois, is now a department of the Chicago Association of Commerce, coöperating closely with the National Safety Council.

The Safety Council has undertaken the task of educating the people of this community in safety principles and practices in order to bring about a substantial reduction in the number of accidents of both a public and an industrial character. The Safety Council is a non-profit, non-commercial and non-political organization. The sole purpose of its existence is to make Chicago a safer city. It will conduct its activities by means of various committees, and function through the schools, homes, churches and industries with the object of developing an interest in safety on the part of every one.

Conservation of land, timber, minerals, water-power, etc., has been taught and practiced in this country for a great many years. Conservation of men, of infinitely greater importance, is a relatively new science. This is accomplished by activities designed to educate people in accident prevention, or, as it is commonly called, safety.

Most Accidents Preventable

Experience has taught that at least three-fourths of all accidents are due to causes under control by the victims or by those associated directly or indirectly with the accident; and that about one-fourth of the accidents are chargeable to the failure of materials, lack of proper mechanical guards, etc. This emphasizes the fact that about 75 per cent of all accidents are preventable by education, and it is to this phase of accident prevention that the Chicago Safety Council is devoting its energy.

How necessary it is that every one become interested in this matter is demonstrated by the fact that last year nearly 2,000 people were accidentally killed in Chicago and Cook County; and that in the first ten months of 1920, 440 people met death in this territory by automobile accidents alone. The Safety Council is endeavoring to make people appreciate that, after all, human life is the most precious asset of individuals and, at the same time, the greatest asset of the nation; that it is better to be careful than to be crippled; that the exercise of caution is a duty which every individual owes to himself, his family, his employer and his country.

Accident prevention is now generally recognized as one of the larger economic problems of the times. It is estimated that last year an average of 222 persons per day were killed in accidents of all sorts in the United States; and that during the nineteen months this country was engaged in the world war, more Americans were killed here at home than on the battlefields of Europe. The National Safety Council estimates that some one is killed somewhere in this country in an automobile accident every thirty-five minutes!

These statistics should convince the most skeptical of the magnitude of the problem in both its humanitarian and its economic aspects. Chicago proposes, through the Chicago Safety Council, to effect a marked improvement in its accident record, thereby

Road-Building by Tractor Quicker and Cheaper

IN breaking new roads, in grading, scarifying, plowing, excavating, leveling, and in heavy hauling, the Best Tracklayer Sixty does the work better and faster than horses and does it at less cost. Its tremendous drawbar pull enables the Best to maintain an even cut with the grader. The power is unfaltering. There are no animals to favor on tough soil. No expert drivers needed to keep horses pulling together. The Best furnishes compact, dependable, easily-managed, flexible power, taking the place of 30 horses or mules and operating at a much lower cost. Besides, the Best will do a great deal of work which horses cannot perform.

Another advantage in favor of the Best Sixty for road work is its ability to negotiate ground too soft for animals and too rough for trucks. The long, wide tracks distribute the weight over so great an area that the ground pressure per square inch is less than that of the average-sized man. The tracks also bridge ruts and holes and gaps, enabling the Best to work efficiently under very unfavorable ground conditions.

There are many mechanical features of the Best that are responsible for Best performance. This tractor is the result of a development covering many years of tractor-building experience. Design, choice of materials, engine, workmanship — all have been time-tested and proven in actual practice. For years the Best has been conspicuously successful on the big heavy-duty work of the West.

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C. L. Best Tractor Co.

San Leandro California

making the city a safer and at the same time a better city in which to live.

HARRY J. BELL,
Secretary, The Chicago Safety Council, Chicago Association of Commerce.

Chamber Aids Firemen and Policemen

SIOUX CITY, IOWA.—The December issue of THE AMERICAN CITY carried a story about the manner in which the Sioux City Chamber of Commerce secured higher pay for the employes of the local traction company. The story that follows relates to a similar activity, that of securing an increase in the wages of the city's policemen and firemen, who were leaving their positions for positions elsewhere offering higher remuneration. The increase in the cost of living found the men unable to finance their affairs on the inadequate wage they were receiving, and an appeal to the city for more pay revealed the fact that no funds would be available for such a purpose until in April, 1921, when additional revenue would be coming into the city treasury. The matter could not be postponed, however. The city's safety was at stake and immediate action was imperative if efficient police and fire departments were to be maintained.

The critical situation which had arisen was brought to the attention of the Chamber of Commerce, which immediately appointed a committee to make a thorough investigation of all the conditions and report to the Board of Directors with recommendations. This committee appeared before the City Council and satisfied itself that the city's finances would not permit the granting of higher salaries to the men in question before the date mentioned. The committee next investigated the living conditions of the men themselves and found them to be seriously in need of more money than they were receiving.

Having satisfied themselves that the policemen and firemen were entitled to better wages than the city could provide, the members of the committee suggested to the Board of Directors of the Chamber that there be raised among the business men a fund from which the salaries the men were at that time receiving could be augmented until the city could take care of the matter. The suggestion was adopted, and soon thereafter pledges aggregating $40,000 were secured from the local business establishments, which willingly pledged themselves to pay into the fund, known as the Firemen's and Policemen's Service Fund, a certain sum monthly until April of 1921. Thus each man was provided with an additional $25 a month, which they receive simultaneously with their regular pay from the city. This made the men much more contented, and the city is consequently safer.

The work of the Chamber of Commerce in this instance has brought about a much closer relationship between the city's guardians and the business men. The fund is being administered jointly by the Chamber of Commerce and the city's Commissioner of Public Safety.

WILLIAM HOLDEN,
General Secretary, Sioux City Chamber of Commerce.

Findlay's Fire Prevention Campaign

FINDLAY, OHIO.—The complete reorganization of the Fire Department and the installation of motorized fire-fighting equipment is assured the city of Findlay as a result of the activities of the local Chamber of Commerce. The committee which has been working on the problem found that the department was years behind the times in its internal organization and that the Fire Chief lacked the requisite authority to enable him to improve the conditions.

The first step in the campaign waged by the Chamber of Commerce in its effort to get the City Council to purchase up-to-date apparatus and reorganize the department was to arouse the interest of the public in the subject. This was done during Fire Prevention Week, conducted by the Chamber of Commerce during the week of October 18, 1920. During this period the interest of the public schools was especially enlisted. Home inspection blanks were distributed among the pupils in an effort to eliminate the fire hazards; 1,500 of these were filled out by the children, who were also asked to write essays on fire prevention.

Both the Kiwanis and Rotary Clubs cooperated actively to make Fire Prevention Week a success. A forceful speaker was brought from New York to address an open forum meeting held by the Chamber of Commerce for the purpose of discussing the subject of fire prevention. The services of fifty state inspectors of fire hazards were

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Road officials and contractors everywhere use "Caterpillar" Tractors because the "Caterpillar" has proved dependable, thru years of service, for the whole range of power needs in modern road making and maintenance.

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also secured, and approximately 300 special inspections were made by them.

All these activities revealed conditions which convinced the members of the City Council of the necessity for making the improvements in the Fire Department urged by the Chamber of Commerce. An ordinance giving the Fire Department extensive powers was subsequently presented to the Council and favorably acted upon by it; and the Council has assured the Chamber that it will support the detailed recommendations for improvement that are finally made. Two experts were appointed to make an intensive study of the department, and after they have completed their work it is expected that a top-notch fire chief will be brought to Findlay to organize and train the local force.

J. B. ABELL,
Managing Secretary, Finlay Chamber of Commerce.

Farmers Shown Advantages of Motor Trucks

PORTSMOUTH, OHIO.—The fine spirit of coöperation which characterizes all the activities of the Portsmouth Chamber of Commerce was again exemplified in the "motor truck on the farm" tour which was conducted recently by that organization. Practically all the truck dealers in Portsmouth participated in this tour, and the only two who did not remained out because of their inability to procure trucks in time.

A "motorcade" (you cannot say "cavalcade" when speaking of automobiles!), consisting of a Buick coupelet, a Chevrolet suburban car, a Chevrolet 2-ton truck, a Nash 1-ton truck, a Nash 2-ton truck, a White 2-ton truck, a Stewart 2-ton truck, a GMC 1-ton truck, a GMC 2-ton truck, and an Overland service wagon, left the Portsmouth Chamber of Commerce on a Tuesday morning and were on the road until Saturday noon of that week. They covered five counties and a distance of over 400 miles. Two weeks before the tour took place an advance agent distributed large posters over the territory to be covered, and announced the time when the cars would arrive at each country town. Another man was designated to reach the town one hour before the arrival of the automobiles and perfect the arrangements for the exhibit.

An Alamo lighting system was set up on one of the GMC trucks, and at night the entire line of cars was illuminated by wire stretched over the trucks. Music was provided by the use of a piano mounted on one of the trucks, and by a cornetist, a saxophone player and a trap drummer who accompanied the party.

At each stop in the village short talks were given on "Motor Trucks on the Farm," after which the cars proceeded to a farmer's field which had previously been selected for the exhibit, where a demonstration was given on hauling manure spreaders, hauling in hay, pulling hay-cutters and pulling wheat binders. Cards giving the names of all the trucks in the exhibit were distributed at each town, with the request that any one interested in any particular type check that make on the card and send it, with his name and address, to the Portsmouth Chamber of Commerce, which would send full information about the car from the dealers.

The tour was in no sense a sales effort, but was intended to bring to the farmers' attention by actual demonstration the advantages to be gained from the use of such labor-saving equipment. No literature was distributed and no effort was made to sell cars, thereby placing all the dealers on an equal footing.

The success of the tour was much greater than the Chamber anticipated. In all the small towns visited, large crowds of farmers gathered to examine the trucks and to listen to the talks. The music rendered by the small orchestra which accompanied the party was also appreciated, and in every way the tour more than justified the time and expense connected with it. Each automobile dealer contributed $50 towards the general expense, and they all felt that the tour was the best advertising in which they had ever invested.

J. B. WILES,
Formerly Manager, Portsmouth Chamber of Commerce.

Chamber Helps to Finance Water Conservation Project

SAN JOSÉ, CALIF.—Valuable assistance has been rendered the ranchers and fruitgrowers of this section by the San José Chamber of Commerce through its assistance in financing a water survey preliminary to establishing irrigation districts and reservoirs in the mountains near-by, where the surplus water which accumulates during the winter and spring months may be held for use as needed.

The orchards in the Santa Clara valley

PACKARD

Prompt Bus Service Pays Dividends

If passenger-carrying busses are to be operated at a profit, they must maintain schedules, regardless of weather and road conditions.

Because Packard trucks have a known reputation for dependability, combined with low hauling and repair costs, the New Jersey Auto Bus Association, of Newark, N. J., purchased a fleet of Packard trucks and fitted them with specially designed bodies, each of them capable of carrying fifty passengers.

These busses, which develop fifty horsepower and roll day in, day out, at speeds up to 28 miles an hour, serve the public with safety, dispatch and comfort, and without the annoying waits and delays that invariably lead to lost patronage.

Because of this excellent service, these busses, in turn, pay their owners a maximum return on their investment.

They perform as Packard trucks habitually perform—crowding more work into each day at a lower cost—because they are correctly designed, precisely built, and scientifically specified to the job.

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Ask the man who owns one

produce from $40,000,000 to $50,000,000 worth of cherries, apricots, prunes, peaches, pears, plums, apples and other fruits every year, and require an abundance of irrigation, but with no irrigation districts or reservoirs in which to hold the winter waters, the majority of this natural water-supply runs down the streams in swift torrents and empties into San Francisco Bay. The orchard acreage is increasing yearly, and it was found that the thousands of irrigation wells by which they are maintained were steadily lowering the underground water-level. The fruit-growers last spring therefore began to look around for ways and means of establishing irrigation districts and reservoirs in the surrounding mountains in which the tremendous volume of water that goes to waste during the winter and spring months could be conserved.

It was necessary first of all to have a survey made of the district, and this, it was estimated, would cost $20,000. The horticulturists appealed to the Chamber of Commerce for assistance in raising this sum. The Chamber found that the County Board of Supervisors was able to appropriate only $5,000 toward such a fund. This amount the Chamber agreed to augment by undertaking to raise $7,500, if the fruit-growers would produce a similar amount, thus completing the required total of $20,000.

Dues Credited to Funds

The Chamber launched a campaign for new members, and announced that every dollar received for new memberships during the months of May, June and July would be placed in the water survey fund. The campaign committee secured the coöperation of the Rotary Club, the 100 Per Cent Club, the Lions Club, the Progressive Business Men's Club, the Merchants' Association, and the Santa Clara County Automobile Association, among which competing teams were organized. Manager Roscoe D. Wyatt, of the Chamber, prepared the prospect list.

Reports were made at the luncheon meetings held daily during the campaign, and the Chamber of Commerce was soon able to tell the fruit-growers that it had gone over the top in raising its share, its campaign producing more than $8,000. The fruit-growers also exceeded their quota, and incidentally added many of their number to the Chamber's membership.

Since its reorganization a little over a year ago by the American City Bureau, the San José Chamber of Commerce has accomplished much that is worth while, but this activity stands out perhaps more prominently than any other because of the fine spirit of coöperation which the campaign engendered among the agricultural and horticultural interests throughout the entire valley. The Chamber feels that the financial assistance rendered, while great, is the least substantial result of the undertaking, and that the cordial and helpful relations that were established constitute a more lasting result, which cannot fail to be a valuable factor in the progress of the community.

V. J. LaMOTTE,
President, San José Chamber of Commerce.

Civic Activities Portrayed in Pageant

PITTSBURGH, PA.—A very interesting and illuminating pageant was given in Pittsburgh on December 8 by the Civic Club of Allegheny County as the crowning event of twenty-five years of effort for civic betterment. In it were depicted the problems with which the Club has been confronted during that period and the progress that has been made toward their solution.

The actual presentation of the pageant was preceded by a short program of music on the new organ in Carnegie Hall, and an address by Herbert Adams Gibbons on "Opportunities and Responsibilities for Americanism."

In the opening scene of the pageant the Spirit of the City was shown as a great, powerful blacksmith, seated on a throne, and sleeping, shackled by chains of gold and custom. Below his throne sat his evil counsellors, Worldly Power, Greed, Pride and Complacency, impersonated by four men; and below them, in the outer darkness, groups of individuals representing the victims of those evils against which the Civic Club has struggled. The time was that of the inception of the Civic Club twenty-five years ago. Civic Spirit, denoting service, next appeared, and in a prologue related her problems and purposes, and then the action began.

The evil counsellors agreed upon the appointment of Worldly Power (Self) to represent them. While they were deliberating, Civic Spirit descended to the groups below and touched one after another of the vic-

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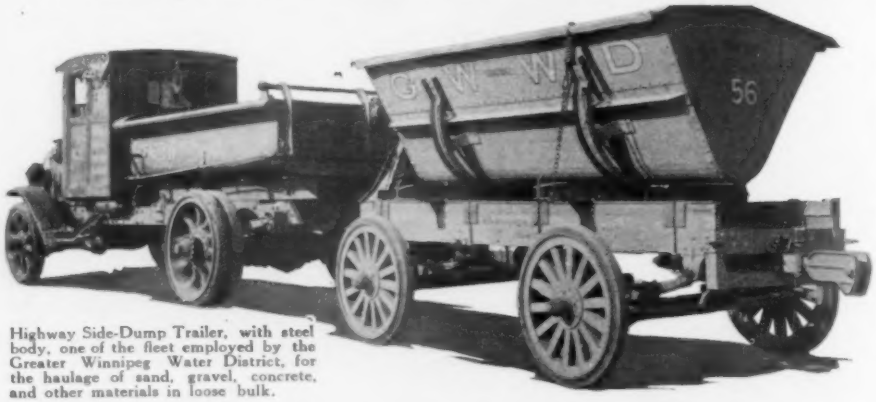

Highway Side-Dump Trailer, with steel body, one of the fleet employed by the Greater Winnipeg Water District, for the haulage of sand, gravel, concrete, and other materials in loose bulk.

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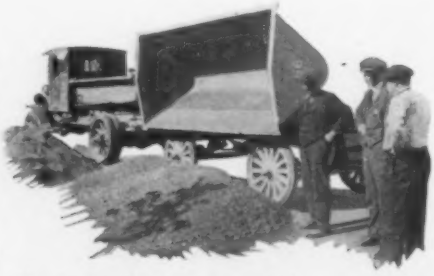

Note how completely the automatic dump empties the carrier. Also observe that the load is pitched entirely clear of the wheels.

The exclusive advantages which distinguish Highway Trailers are a much greater factor in the wide preference they enjoy, in all sorts of transportation, than even the big price saving they effect.

The steel-body, side-dump trailer, shown in the illustrations was specially designed for road and street building, and the practical elimination of slow, costly hand-shoveling in loading and unloading.

The release of a lock automatically pitches the load clear of the wheels in the desired direction One man easily returns the body to the upright position.

There is also the steel-body, two-way, side-dump trailer with drop-frame, similar in appearance, but lower, which operates in almost precisely the same manner, and which is chosen by many contractors and road engineers because of the drop-frame feature.

Write for literature and any special information required

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tims of the evils referred to—Joyless Childhood, the Unclean, the Plague-Stricken, Youth in Idleness, the Disinherited, and the Unprosperous, questioning each. Worldly Power (impersonated by a man) reproved her for her inquiries. She tried to awaken the Spirit of the City (the Smith). He did not hear her. And so, having found plenty of work to do, she called to her aid the four branches of the Club's activity—Government, Social Science, Education, and Art, which were impersonated by four women. With the help of these she started out upon her mission of reform.

The Club's activities during the twenty-five years' period were next portrayed. For the Unclean a pure water-supply was obtained and public baths opened. For Childhood, playgrounds, the Juvenile Court, the open air schools, the child labor law, etc., were attained. For Youth, the recreation program and new educational opportunities in the night schools were made available. For the Plague-Stricken, the tuberculosis campaign, the Municipal Hospital, various forms of health legislation, the tenement law, and the new sanitary code, were achieved. Then followed legal aid and Associated Charities, city planning and the organization of citizenship and Americanization campaigns. As these movements proceeded, the chains gradually fell from the Smith and he awoke.

A grand festival then took place in celebration of the anniversary of the Civic Spirit's organized effort. It was a festival of rejoicing, to which all who had participated in the work, and all good citizens as well, were invited. During this festival the long silent Smith spoke at last. He rejoiced with the rest, but he solemnly warned the Civic Spirit and her ministers not to pause midway in their task, but to proceed with their never-ceasing struggle for the better day, the city of the future that is to be.

Thomas Wood Stevens, Director of Dramatic Art of the Carnegie Institute of Technology, was the author of the pageant and rehearsed its production. The cast was made up of "Tech" dramatic and music students, the Guild Players, public school children, foreign-born citizens of twelve nationalities, and 25 young society girls who represented candle spirits, one for each year of the Civic Club's existence.

(MISS) H. M. DERMITT,
Secretary, Civic Club of Allegheny County.

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All Strikes End Sooner or Later

The reason we were able to finance the War so well is that business was good—people bought and sold. The only way we can PAY for the war is by buying and selling—trading.

If you are on a buying strike—"forget it."

If you won't buy the things the other fellow makes or handles HE can't buy the things YOU make or handle. That is reasonable, is it not? Those who are insistently determined to put off the buying of the things they need are not doing humanity a service, they are helping to clog the wheels of commerce and industry which will cause dire results.

Your livelihood and prosperity are bound up in the livelihood and prosperity of other men—you can't deny that point. There is nothing fundamentally wrong with this country—there are bountiful crops, ample money, capable heads and hands. Business is a gigantic organization kept alive and active by trade coursing through its veins. When trade stops circulating—business dies. No man's trade can flourish in splendid isolation. You can't sell the articles you make or handle to the man "out of a job" or the industry whose wheels are stopped.

True thrift is always wise, but if the public refuses to buy the things they need NOW they are stopping up the channels that feed and clothe us ALL.

Go out and buy to-day the things you need, for the prices ARE down. They went up a step at a time and they can't come down the bannister. If you wait for the "bottom to drop out" neither you nor the other fellow may be able to buy then.

THINK and BUY the THINGS you NEED now

Winston-Salem Chamber of Commerce

This is One of a Series of Advertisements Being Published in the Daily Newspapers of Winston-Salem by the Chamber of Commerce in an Effort to Do Its Share to Stimulate Buying and Stabilize Business.

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for laying and repairing bituminous macadam and asphalt pavements Solves the need of municipalities, counties, state highway departments and paving and road building contractors for a sturdily built, easily portable ¾-yard plant which combines all the necessary requirements either for laying new pavements or keeping streets and roads in repair. The mixing is so thorough that every batch is a *perfect* batch. The weight of the machine is approximately 15,000 pounds and it may be readily drawn by tractor, road roller or horses.

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already owning stationary asphalt plants will find the "Simplex" single unit plant a tremendous money saver for all work not requiring the full capacity of the large plant and utilizing the old asphalt which can be successfully worked into pavements by the use of the "Simplex" machine. Cities and Villages as yet unsupplied with a paving plant will find in the "Simplex" a means of reducing their paving and maintenance expense to the minimum consistent with good work.

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Gas Tank Ordinance Void Which Makes Issuance of Permit an Arbitrary Power

City of New Orleans Ordinance No. 2126, amended by Ordinance 5453, requiring a permit for the operation of a portable gas tank on a city street, without prescribing any terms or conditions on compliance with which a permit shall be granted, or without which it shall be withheld, purports to confer arbitrary power to grant permission to conduct a legitimate business to one person and withhold it from another in a like situation, and is therefore void. (Louisiana Supreme Court, City of New Orleans vs. Palmisano, 83 Southern Reporter, 789.)

Vested Right of Policeman to Pension and Place Under San Francisco Charter

Under the San Francisco charter a police officer placed on the retired list and regularly granted a pension on proof of disabilities has a vested right to retain his place on the retired list and to have his pension continued until his disabilities cease. (California District Court of Appeal, Sheehan vs. Board of Police Commissioners, 190 Pacific Reporter, 51.)

Railroad Company's Right of Way Cannot Ordinarily Be Assessed for Local Improvements

A railway company's land is not subject to street improvement where such land is a part of its right of way used exclusively in operating its train service and there is no showing it would ever be used for any other purpose.

In reaching this conclusion in the case of Johnston City vs. Chicago & Eastern Illinois Railroad Company, 124 Northeastern Reporter, 568, the Illinois Supreme Court said:

"There are unusual conditions under which a railroad right of way can be said to be beneficial by a local improvement, but as a general rule it cannot be. The limit of an assessment for benefits resulting from paving a street is the enhanced value of the property, and where its use is restricted to the running of trains there can be no assessment unless the value is increased for that use. Where the property is restricted by statute or grant to a particular use, and cannot be legally applied to any other use, and is at the time of the improvement devoted to such particular use, the true measure of the benefit which the improvement will confer is the increased value for the restricted use, in the absence of proof reasonably tending to show that the property in question, having regard to present conditions and the existing business and wants of the public, is about to be devoted to other uses.

"In this state, however, it is a settled rule that the property of a railroad corporation, even though used for railroad purposes, if benefited, may be assessed for a local improvement. But an increase in freight traffic and the general business of appellant cannot be considered in assessing benefits to its right of way."

Owner of Land Benefited by Improvement Not Personally Liable for Assessment

Under a statute providing for payment for a local improvement by special assessment against benefited property, the land alone is liable; if that is insufficient to pay the assessment, resort cannot be had against the owner personally for payment of the balance. (North Carolina Supreme Court, Town of Morgantown vs. Avery, 103 Atlantic Reporter, 138.)

Charter Provision Impliedly Repealed by General Statute

Provision in a municipal charter requiring a two-thirds vote of electors before a bonding limit can be raised is impliedly repealed by a general statute subsequently enacted authorizing cities to raise such limit by a three-fifths vote. (Michigan Supreme Court, City Commission of Jackson vs. Vedder, 176 Northwestern Reporter, 557.)

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Liability of City on Local Improvement Bonds Considered a Debt in Ascertaining Constitutional Debt Limit

Under the provisions of the Kentucky constitution limiting the debt limit of cities, contracts for local improvements to be paid for wholly by special assessments against benefited property are not to be regarded as creating municipal indebtedness. But if the city becomes a guarantor of the payment of principal and interest on local improvement bonds, and not merely a collector of the special assessments for the benefit of the holders of the bonds, then the debt evidenced by the bonds is to be counted in ascertaining whether the constitutional debt limit is being exceeded. (Kentucky Court of Appeals, Castle vs. City of Louisa, 219 Southwestern Reporter, 439.)

Municipality Not Liable for Flooding from Sewer Where Owner Could Have Prevented Damage—Court May Require Sewer to Be Properly Constructed

Applying the general rule that one may not recover damages for an injury caused by the negligence of another when such injury readily could have been avoided by the use of ordinary care on the part of the injured person, the New York Supreme Court holds in the case of William P. Greiner Building Corporation vs. Town of Cheektowaga, 181 New York Supplement, 759, that a municipality is not liable for damage resulting from backing up of a sewer and flooding of cellars where the damage easily could have been prevented by the property owners or occupants by using caps on drains on their premises, although the town may have been negligent in respect to maintenance of the sewer in its particular condition.

The Court also holds that a municipality is not liable for mere errors of judgment in making such public improvements as streets, sewers, etc., but that this rule could not operate to relieve defendant town from liability for negligence in permitting surface waters to enter and overtax a sewer which was adequate only for the purpose of caring for house drainage. It was further decided that where a town constructed a house drainage sewer so that at flood times surface waters entered it, overtaxed it, and flooded cellars of property drained, the owner of such property is entitled to mandatory injunction requiring the town to cover or reconstruct manholes sufficiently to exclude surface waters, although owner is not entitled to damages on account of his own failure to cap drains in cellars and thus prevent flooding.

Ordinance Requiring Consent of Adjoining Landowner Before Issuance of Permit to Erect Public Garage, Held Invalid

An ordinance of the city of Wilmington, Del., declaring that no permit shall be granted by the building inspector for the erection of a public garage in the residential portion of the city within 40 feet of adjoining land without the consent of the owners of such land, is invalid.

In reaching the above-stated conclusion, the Chancellor of the Court of Chancery of Delaware recently said in the case of Myers vs. Fortunato, 188 Atlantic Reporter, 678:

"It seems to me clear that private persons to whom as owners of land is given the power to control the use by the owners of adjoining land of their property are presumably governed by self-interest, and are more apt than an official to be arbitrary and unjust when their own interests are affected. Obviously, then, decisions which uphold the validity of an ordinance giving to a single official arbitrary power to make effective an ordinance do not apply to legislation which gives such power to private persons when control is thereby given them over the use of land or other private persons."

Construction of Missouri Constitution as to One Person's Holding More Than One Office

The clause of the Missouri constitution providing that in cities or counties with more than 200,000 inhabitants no person at the same time shall be state officer and officer of any county, city, or other municipality, and that no person shall fill two offices either in same or different municipalities, applies as a whole only in counties and cities having more than 200,000 inhabitants; so that the marshal of a city of the fourth class could also and at the same time hold the office of constable of the township in which the city was situated. (Missouri Supreme Court, Nickelson vs. City of Hardin, 221 Southwestern Reporter, 358.)

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Ordinance for Licensing Lodging-Houses Held Valid

An ordinance forbidding the operation of lodging-houses wherein sleeping quarters for three or more persons are provided without payment of a license tax or securing a permit, is not invalid as being unreasonable and discriminatory. (Missouri Supreme Court, City of St. Louis vs. Murta, 22 Southwestern Reporter, 430.)

Wooden Building Erected Within Fire Limits in Violation of Ordinance May Be Ordered Demolished

Where a wooden building was erected within the fire limits of a city, in violation of an existing ordinance, it could be ordered demolished by the municipal authorities on refusal of the owner to raze it, although the ordinance under which the building is so condemned was adopted after the structure was erected, holds the California District Court of Appeal in the San Francisco case of Maguire vs. Reardon, 183 Pacific Reporter, 303.

It is further decided that the fact that the Board of Public Works of the city may have issued a permit for construction of the building could not preclude the city from enforcing condemnation of the building. And it is held that even if the ordinance providing for demolition of buildings maintained in violation of the fire ordinance should be unconstitutional, a court would not lend its equity power to perpetuate the nuisance constituted by erecting a frame building within the fire limits in violation of the fire ordinance, by enjoining enforcement of the invalid ordinance.

Right of City to Prescribe Patented Material Under Competitive Bidding Contract

"While there is some conflict of authority upon the question of the right of the officers of a municipality to prescribe a patented material for street paving under a statute or charter requiring competitive bidding, the great weight of the more recent authorities is in favor of such right, where the owner of the patent does not himself bid for the contract, but makes an offer to furnish the patented material or mixture for a stipulated price, on equal terms to all bidders." (Tennessee Supreme Court, Burns vs. City of Nashville, 221 Southwestern Reporter, 828.)

Charter Provision Empowering City to Regulate Use of Streets and Public Grounds is Authority for Ordinance Requiring Permit for Parade

Municipal authorities who are active toward the adoption of measures intended to prevent seditious and disloyal meetings and demonstrations in public will be interested in the decision of the Appellate Division of the New York Supreme Court in the case of City of Buffalo vs. Till, 182 New York Supplement, 418.

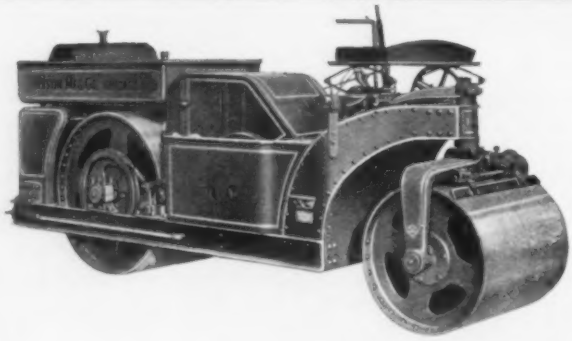
Defendant appealed from a judgment fining him $50 for violation of an ordinance of plaintiff city containing the following provision:

"No person shall participate in any parade, gathering, assemblage or demonstration upon any street, square, park or other place within the city to which the public are invited or have access, which parade, gathering, assemblage or demonstration has not been authorized by a written permit from the mayor."

Grounds upon which defendant unsuccessfully sought to secure a reversal of his conviction included a contention that the Buffalo charter did not authorize the adoption of such an ordinance. But the Court found that such authority amply existed in clauses of the charter empowering the city to enact ordinances "to define and prevent disorderly conduct; to prevent all disorderly assemblages;" "to regulate the use of streets, alleys, wharves and public grounds, and to declare in what manner and for what purpose they shall not be used;" "and such other and further ordinances not inconsistent with the laws of the state, as shall be deemed expedient for the good government of the city, the protection of its property, the preservation of peace and good order, etc."

Either Consumer or Village May Maintain Action to Enforce Gas Franchise Rates

Provision in the franchise of a gas company that it should not charge consumers in a village more than $1.40 per 1,000 cubic feet, constituted a contract for the benefit of consumers, on which either the village or any consumer might maintain action for enforcement. (New York Supreme Court, Village of Freeport vs. Nassau & Suffolk Lighting Company, 181 New York Supplement, 830.)



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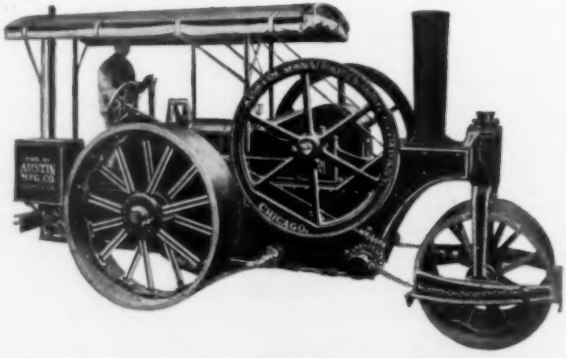
Austin-Western Road Machinery has won for itself an enviable reputation not only in this country but in practically every country of the world where roads are built.

Austin Roller performance has had a tremendous influence in moulding this universal conviction of 100% worth. Consequently it is in the interests of every road contractor to become thoroughly acquainted with this group of Road Equipment.

Austin Rollers are built in Tandem motor types in four sizes and Three-Wheeled types—steam and motor—in five sizes. They have been specially designed to meet modern road making conditions and will prove a positive asset to the road contractor who owns one.



THE AUSTIN-WESTERN ROAD MACHINERY COMPANY

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Richmond	Los Angeles	Albany	Nashville	Jackson
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EXPORT DEPARTMENT

ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

Municipal and Civic Publications

THE ROMANCE OF OUR TREES.

Ernest H. Wilson, Assistant Director, Arnold Arboretum, Harvard University. Doubleday, Page & Company, New York. 1920. XVI + 278 pp. Illustrated.

A most readable and instructive volume for all who would know more of the history of the trees of our country. The opening chapters tell of the intimate association of trees and mankind from the earliest times. The book is written in non-technical language and in a manner which is readily understood by the uninitiated. The remarkable geographical distribution of trees influenced by the geological eras, notably the glacial epoch, wherein species known on one continent appear in local areas on another, is outlined. The relationships of the trunks of trees and their autumn splendors are described in interesting detail.

The stories of trees which have meant much in history and which are well known to the average reader are told in detail, particularly those of the ginkgo, the cedar of Lebanon, the common yew, the horse-chestnut, the magnolia, and the European beech. Following these are discussions of our nut trees, which have been urged so generally as sources of revenue to governmental units when used as shade trees along our streets. Our common fruit trees, as well as the Lombardy poplar and the willow of Babylon, are accorded chapters of their own. The closing chapters contrast the tall and stately trees and those which grow only as pigmies.

RECREATION.

Three pamphlets, reprinted from "The Playground": "Recreation as a Function of the Church," "Folk Dancing as Social Recreation for Adults," by Elizabeth Burchenal; "What We Did on a Summer Playground in Chicago," by Genevieve Turner Holman. The third contains suggestions for activities on any small children's playground. Published by the Playground and Recreation Association of America, 1 Madison Avenue, New York City. (Apply to publishers.)

ACCIDENT PREVENTION.

"A Course of Study in Safety Education." By Harriet E. beard, Supervising Instructor of Safety Education, Detroit Teachers' College. 1920. 31 pp. An article by the author in the department of "Forward Steps," in this issue of The American City describes this course and its application in the Detroit Public Schools. (Apply to author.)

MILK SUPPLY.

"Pasteurization of Milk." Report of the Committee on Milk Supply of the Sanitary Engineering Section of the American Public Health Association. 32 pp. 1920. The report contains up-to-date information on the effect of pasteurization on the composition of milk, the process of milk pasteurization, the analytical control of pasteurization plants and state and municipal supervision of the pasteurization of milk. (Apply to A. W. Hedrich, Secretary of the Association, 169 Massachusetts Ave., Boston, Mass.)

DOMESTIC SANITARY ENGINEERING AND PLUMBING.

F. W. Raynes, Longmans, Green & Company, New York. 1920. XIII + 476 pp. Tables, diagrams and illustrations.

An interesting book from the English technical press covering the subject as stated in the title and devoting little space to the municipal side of sanitary engineering. It covers the subjects of roof work, pipe fixing and pipe bending, pipe joints, solder, fluxes and lead burning, sanitary fittings and accessories, soil and waste pipes, drainage of houses and other buildings, disposal and treatment of sewage from mansions and houses in country districts, water-supply, appliances for raising water, hydrostatics and hydraulics, domestic hot-water supply, and low-pressure hot-water heating systems, and includes an appendix containing handy tables. Specific instances of house problems are worked out in the text.

INSTRUCTION IN AMERICANIZATION.

"Training Teachers for Americanization." A course of study for normal schools and teachers' institutes, by John J. Mahoney, State Supervisor of Americanization for Massachusetts, with a chapter on Industrial Classes, by Frances K. Wetmore, of the Public Schools of Chicago, and on Home and Neighborhood Classes, by Helen Winkler and Elsa Alsberg, of the Council of Jewish Women. Published as Bulletin 1920, No. 12, by the Department of the Interior, Bureau of Education. 62 pp. (Apply to the Bureau of Education, Department of the Interior, Washington, D. C.)

THE PROBLEM OF AMERICANIZATION.

Peter Roberts, Ph.D. The Macmillan Company, New York. 1920. vii + 246 pp.

The author of this book has been director of the Americanization activity of the Y. M. C. A., and for fifteen years has been in intimate contact with immigrants in every state in the Union. The purpose of the book is to aid men and women giving all or part time to Americanization work; it submits a definite program and plan of operation, and outlines methods by which men and women may be trained for this work.

OLD VILLAGE LIFE.

Or "Glimpses of Village Life Through All Ages." By P. H. Ditchfield, F. R. Hist. S. E. P. Dutton & Company, New York. 1920. xii. + 253 pp. Illustrated.

This volume traces the development of village life in England from prehistoric times down to the present. There is a wealth of quaint antiquarian information and numerous interesting illustrations.

FLYING GUIDE AND LOG BOOK.

Bruce Eltynge, Hon. Lt., Royal Air Force-Pilot, Capt. Aerial Police Reserve, N. Y. C., Member Aero Club of America. Foreword by H. M. Hickam, Maj. Air Service. John Wiley & Sons, Inc., New York. 1921. 150 pp.

A useful hand-book for the amateur or commercial flyer. It gives practical general suggestions, suggestions for laying out landing fields, lists of landing fields in the United States, with details of routes for cross-country flying, and several pages of hints on "trouble shooting" for aeroplane engines. A number of pages have been prepared to be used as a "log" of flights.

FIELD WORK AND SOCIAL RESEARCH.

F. Stuart Chapin, Ph.D., Professor of Economics and Sociology, Smith College. The Century Company, New York. 1920. xi + 224 pp. Charts and diagrams.

This book gathers together the well-tested methods and techniques of social investigation and presents them in an accurate and practical form. The material is so arranged that the reader can readily find the detail of technique in which he is especially interested. Actual field work investigations of many different kinds are described in detail, and the theoretic principles underlying procedure are so stated that the practice may be examined in the light of well-established methods.

NEW YORK CITY.

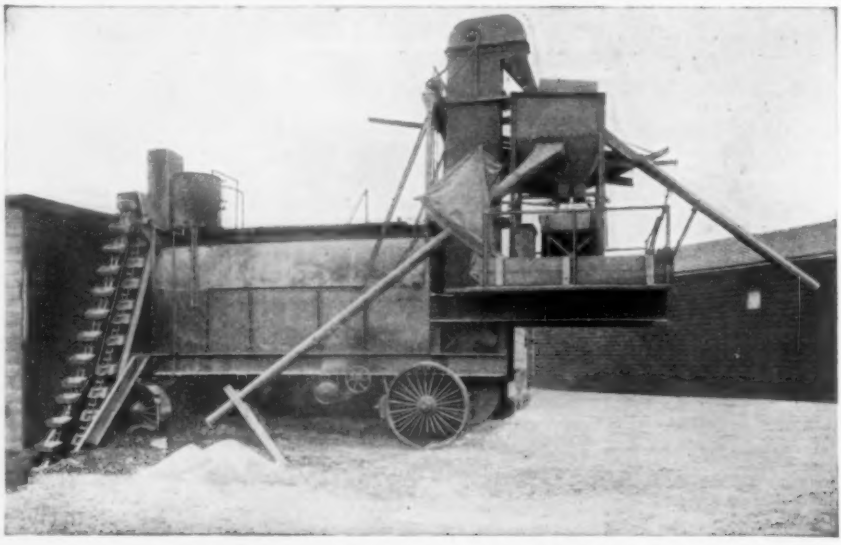
"The Metropolis," Alexander Otis, Editor. Published by the Metropolis Publishing Company, Inc., 318-326 West 39th Street, New York. Vol. I., No. 1. January 1, 1921. Published semi-monthly. A magazine devoted to the interests of the city of New York.

CITY PROBLEMS.

"City Problems": the Proceedings of the Eleventh Annual Meeting of the Conference of Mayors and other City Officials of New York State. 146 pp. 1920. (Apply to William P. Capes, Secretary of the Conference, Albany, N. Y.)

LABOR.

"American Minimum Wage Laws at Work," by Dorothy W. Douglass. 41 pp. 1920. A detailed description of the operation of minimum wage laws in the various states. (Apply to The National Consumers' League, 44 East 23rd Street, New York, N. Y.)



IROQUOIS PORTABLE ASPHALT MIXING PLANTS

"You can't fool the man who runs one"

HE knows that his Iroquois mixing plant is made of tested material of the highest grade and that the chances for breakdown are reduced to a minimum. That's why most of our orders come from previous purchasers or on **their** recommendation.

These mixing plants, like other Iroquois equipment, are the product of 40 years' experience in asphalt street and road building, and 25 years' experience in the designing of equipment for that purpose.

Iroquois mixing plants turn out more work at less operating cost. They furnish 800 and 1250 square yards of 2″ street asphalt topping a day.

Iroquois Portable Asphalt Mixing Plants are made in two types, with and without the power unit on the same frame as the mixer. The especial advantages of each type are described in our Bulletin No. 2A. Write for it at once.

The Barber Asphalt Paving Company

Iroquois Sales Department

PHILADELPHIA

CITY PLANNING.

"Municipal Accomplishment in City Planning and Published City Plan Reports in the United States." Edited by Theodora Kimball, Librarian, School of Landscape Architecture, Harvard University, from information assembled largely by the Detroit City Plan Commission. Published under the auspices of the National Conference on City Planning. 79 pp. 1920. This bulletin was prepared from questionnaires sent to about one hundred cities where planning work in the last twenty years has been represented in published reports. It shows in a striking fashion the character and intensity of municipal activity in city planning at the present time. (Apply to the National Conference on City Planning, 60 State St., Boston, Mass.)

The publications listed above are for sale by their publishers. Those listed below are understood to be free upon application.

MILK SUPPLY.

"Standard Methods for the Bacteriological Examination of Milk." Third edition. 24 pp. 1921. Published by the American Public Health Association. (Apply to the American Public Health Association, 169 Massachusetts Avenue, Boston, Mass.)

MALARIA.

"A Study of the Malarial Mosquitos of Southern Illinois. I. Operations of 1918 and 1919." By Stewart C. Chandler. Maps and illustrations. 1920. Issued as Article XI. of Vol. XIII., by the Illinois State Department of Registration and Education, Division of Natural History Survey, Urbana, Ill. (Apply to Stephen A. Forbes, Chief.)

COMFORT AND SHELTER STATIONS.

"Common Sense and a Public Need." An argument for the installation of comfort stations in Newark, N. J. By Arthur J. Smart. 8 pp. Illustrated. (Apply to author, 48 Hartford Street, Newark, N. J.)

REGINA, SASKATCHEWAN.

An illustrated booklet descriptive of Regina and its vicinity. Issued with the compliments of the Mayor and Aldermen of the City of Regina and of the Members of the Board of Trade. (Apply to Board of Trade, Regina, Saskatchewan.)

RECREATION.

Publications of the Playground and Recreation Association of America. A bibliography. 18 pp. (Apply to the Playground and Recreation Association of America, 1 Madison Avenue, New York City, N. Y.)

HEALTH.

"The Economics of Health," by Ira S. Wile, M. D. Reprinted from "American Medicine," New Series, Vol. XV., Nos. 9, 10, 11, 1920. 23 pp. A detailed consideration of the relation of income to health. (Apply to Ira S. Wile, M. D., 264 West 73d St., New York City.)

LEGISLATION.

Revised draft of a proposed article of the new constitution for Illinois, to be entitled "City of Chicago," to be submitted to the Constitutional Convention. Report of the Special Council Committee on Constitutional Proposals. 7 pp. 1920. (Apply to James T. Igoe, City Clerk, Chicago, Ill.)

REFUSE COLLECTION AND DISPOSAL.

"A Report and Survey with Recommendations Upon the Municipal Refuse Collection and Disposal of the City of Bridgeton, N. J.," by William F. Morse, Consulting Sanitary Engineer. 15 pp. 1920. (Apply to William F. Morse, Hippodrome Building, Cleveland, Ohio.)

FORESTRY.

A State Forest Policy Adopted by the Oregon State Board of Forestry, December 4, 1920. 27 pp. Includes recommendations for federal policy, state policy, and for federal and state coöperation. (Apply to F. A. Elliott, State Forester, Salem, Oregon.)

CITY PLANNING.

The Decatur Plan, made for the City Plan Commission of Decatur, Ill., by Myran Howard West, of the American Park Builders, Chicago. Published by the Decatur Association of Commerce. 171 pp. Illustrated. 1920. (Apply to W. F. Hardy, Chairman of the Commission.)

PIPING.

"The Case Against the Standard Soil Pipe." By A. E. Hansen, Hydraulic and Sanitary Engineer. Prepared for and at the request of the Committee on Research of the American Society of Sanitary Engineering. 29 pp. 1921. The pamphlet is in the nature of a symposium citing the opinions of competent authorities against the standard soil pipe. (Apply to A. E. Smith, Secretary, American Society of Sanitary Engineering, State Department of Health, Columbus, Ohio.)

BUILDING.

The Proceedings of the Sixth Annual Meeting of the Building Officials' Conference. 71 pp. 1920. Report of the Conference, and detailed discussion of building materials. (Apply to Sidney J. Williams, Secretary, Madison, Wis.)

TUBERCULOSIS.

Framingham Monograph No. 8, General Series III. Health Letters. Published by the Framingham Community Health and Tuberculosis Demonstration of the national Tuberculosis Association. 84 pp. 1920. (Apply to Donald B. Armstrong, M.D., Executive Officer, Community Health Station, Framingham, Mass.)

HOUSING.

Seventh (and latest) Annual Report of the Homestead Commission of the Commonwealth of Massachusetts. Published as Public Document No. 103. 23 pp. 1920. Account of the activities of the Commission, whose work has now been taken over by the new Department of Public Welfare. (Apply to Richard K. Conant, Commissioner, Department of Public Welfare, Room 37, State House, Boston, Mass.)

GRADE-CROSSING ELIMINATION.

"The Elimination of Grade Crossings," by Charles H. Huff. A series of six articles reprinted from The St. Louis Star. 30 pp. 1920. Mr. Huff was sent by the Star to various large cities to study grade-crossing elimination, with a view to informing the St. Louis public, as that city was considering plans for getting rid of its grade crossings.

TAXATION.

Annual Report of the [New York] State Tax Commission for 1919. Published by the State of New York as Legislative Document No. 118. 514 pp. 1920. Contains a detailed account of taxation in New York State, with briefer statements of the tax systems prevailing in the other states. (Apply to Walter H. Knapp, President, State Tax Commission, Albany, N. Y.)

CIVIL SERVICE

"Report on a Proposed Classification of Titles and Positions in the Civil Service of the City of Rochester, N. Y." Published by the Rochester Bureau of Municipal Research, Inc., December, 1920. 173 pp. Contains a detailed report of survey of civil service positions in the city, together with recommendations for reclassification and standardization. (Apply to the publishers.)

Municipal Reports

Boston, Mass.—Sixth annual Report of the City Planning Board for the year ending January 31, 1920. (Apply to Elizabeth M. Herlihy, Secretary.)

Bradford, Pa.—First Annual Message to the Council, by Spencer M. DeGolier, Mayor. 1920. (Apply to Hon. Spencer M. DeGolier, Bradford, Pa.)

Chicago, Ill.—Forty-Fourth Annual Report of the Department of Public Works for the year ending December 31, 1919. (Apply to Charles R. Francis, Commissioner of Public Works.)

Chicago, Ill.—Report of the Chicago Zoological Gardens Committee, Forest Preserve District of Cook County. August 9, 1920. (Apply to Frank J. Wilson, Chairman, 547 County Building, Chicago, Ill.)

Hartford, Conn.—Thirteenth Annual Report of the Department of Engineering to the Court of Common Council. For the year ending March 31, 1920. (Apply to Roscoe N. Clark, City Engineer.)

Jackson, Miss.—Quarterly Financial Statement, July 1, 1920, to September 30, 1920, and annual report of the City Auditor for the fiscal year ending September 30, 1920. (Apply to A. W. Tobias, City Auditor.)

Scarsdale, N. Y.—Report of Special Water Committee. (Apply to Richard R. Hunter, Chairman.)

Water Supply and Water Power Engineering

RELIABLE ESTIMATES OF COST

Recommendations as to the best means of carrying out Public Works to insure a maximum benefit from the investment.

PREPARATION OF PLANS
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Methods, Materials and Appliances

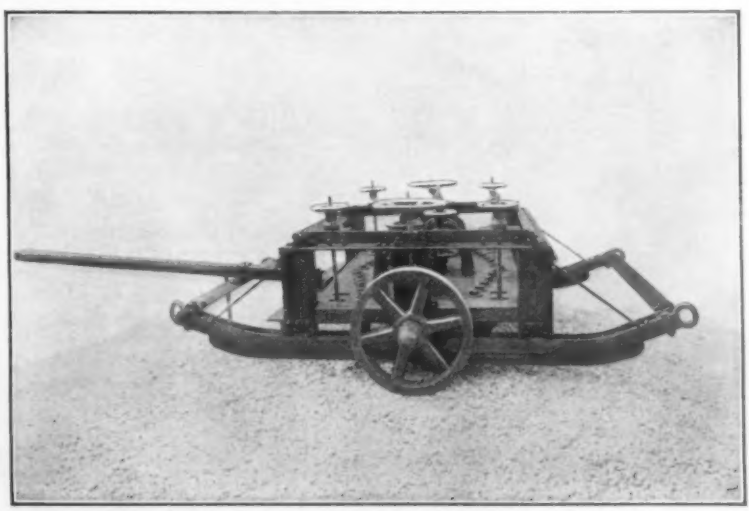
News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

A New Practical Road Planer

A new practical machine for highway maintenance has been invented by Richard A. Jones, for many years Street Commissioner of Waltham, Mass., as a result of his experience and knowledge of the conditions and requirements of modern road construction and maintenance. The Kinney Manufacturing Company, 3520 Washington Street, Boston, Mass., has acquired full rights for the manufacture and sale of this equipment, which is to be known as the Kinney Road Planer, Jones' Patent.

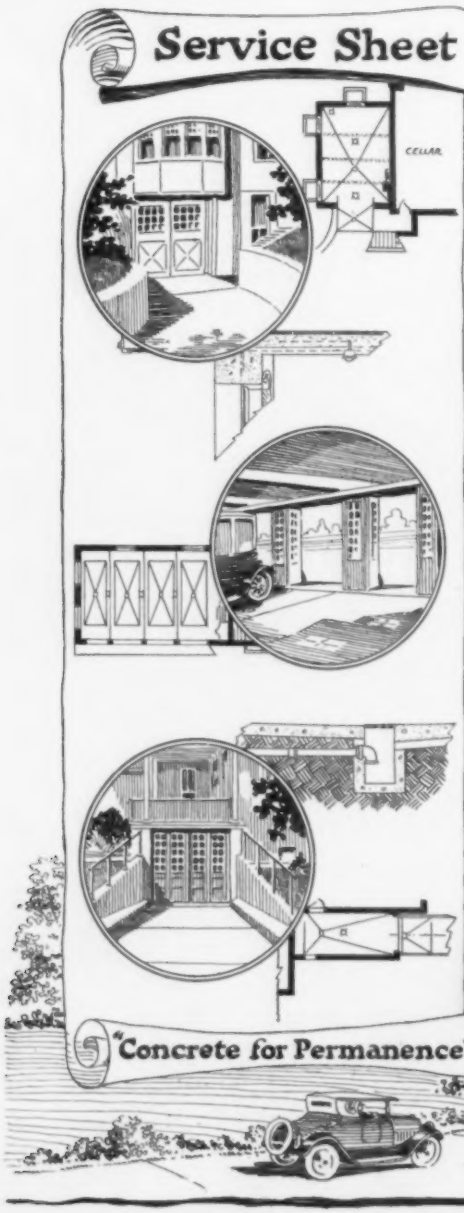
The road planer is especially designed for use on bituminous roads and highways. It is adapted for planing or leveling the waves or ridgy elevations which frequently appear on the road surface. The machine is a combination drag, planer and scarifier. It is constructed entirely of metal and weighs about 3½ tons. It may be drawn by a steam roller or tractor, and the machine is mounted on steel runners. The runners are equipped with removable cast iron shoes, which are of ample length to cover or cross the road waves without following the contour of the surface. Upon the runners is mounted an oscillating iron plate, holding the planer knives and scarifying chisels or picks, all adapted for adjustment by hand-operating screws to meet the varying conditions of the road surface, or according to the kind of bituminous material of which the road is constructed. The entire equipment may be raised or lowered at will or adjusted for planing as required. For moving the machine to a distance or from one job to another, steel wheels are provided, equipped with lifting screws, by means of which the entire machine may be raised and balanced upon the wheels for transportation. When in actual service, the machine is lowered and moved upon the runners. It has a double equipment of picks or planer knives, and may be drawn backwards or forwards without being turned upon the runners.

By the use of this machine the bunches or ridgy elevations can be removed from the road surface without destroying the general contour of the road. The facilities for adjustment of the scarifiers and planers in any desired angularity or depth of cut enable the operator to meet the different conditions arising from changing temperatures or varying viscosities of the material used in the construction of the road. In operation the scarified ridges of the road are smoothed and leveled by the planer knives, and after proper sealing and rolling of the leveled portions, the road may be opened to traffic. If conditions require, the entire surface may be treated with a new seal-coat application of bituminous material, with the necessary covering. While designed especially for use on bituminous surfaces, the



A NEW MACHINE THAT PLANES THE ROAD AS IT SCARIFIES

Concrete Garages Built With House



THERE are a number of reasons for making a garage part of the dwelling: convenience, saving in construction, in lighting and heating, etc.

We recently secured a number of interesting photographs and sketches showing a variety of ways in which a garage has been attached to dwellings, new and old. These suggestions appear on one of our latest Service Sheets bearing the above title.

In addition, we have other Service Sheets or Special Bulletins giving practical hints on the following concrete construction:

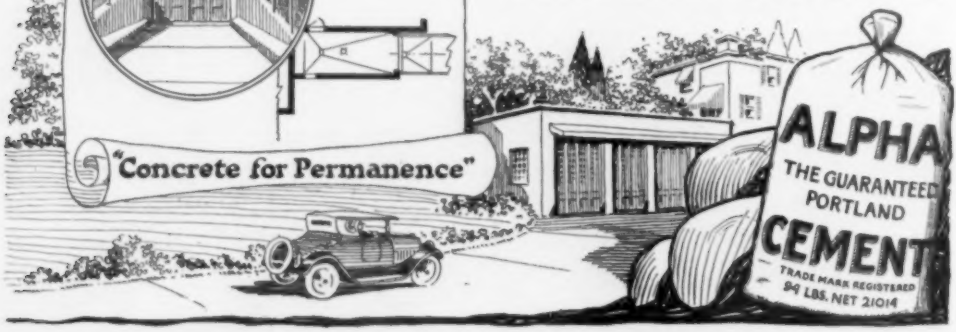
Workingmen's Homes
Walkways and Driveways
Concrete Roads
Bridges and Culverts
Foundation and Hatchway
Gutter and Curb
Storage Cellar
Small Warehouses
Spring House
Small Dam
Milk House
Ice House
Manure Pit
Septic Tank
Oil Storage Tank
Tennis Court
Inclosure Walls
Corn Crib
Storage House
Smoke House
Hog House
Poultry House
Dipping Vat
Tanks and Troughs
Piers for Small Boats
Garden Furniture
Greenhouse
Coal Pocket
Posts and Walls
Walls, Sills and Lintels
Garages and Runways
Overcoating of Old Dwellings
Barn and Silo
Cold-weather Concreting

Ask for the Sheet or Bulletin that interests you most, also for a copy of the Alpha 96-page Handbook on concrete construction if you don't already own a copy. This Handbook is not forwarded unless specifically asked for. All sent free of cost or obligation if you live east of the Mississippi. We are obliged to ask inquirers out of our sales territory to send fifty cents to cover the printing and mailing expense. Mention THE AMERICAN CITY.

ALPHA PORTLAND CEMENT CO.
Offices: EASTON, PA., CHICAGO, ILL.

Branch Offices:

New York, Boston, Philadelphia, Bellevue, Mich. Pittsburgh, Baltimore, Savannah, Ironton, Ohio



planer may also be used to good advantage on macadamized or dirt roads.

In the New Hampshire State Highway Department, where this machine has been thoroughly tested under severe conditions, it has been shown that by the use of one machine during the past season a saving of many thousands of dollars has been effected as compared with the expenditures involved in the usual method of reconstruction and renewal. One of these machines will be on exhibition at the Road Convention to be held in Chicago, February 9 to 12, 1921.

A New Development in Snow Removal

A gang of fifty or sixty men for removing snow from the streets of Chicago was replaced by four men and a new snow loader manufactured by Barber-Greene Company, Aurora, Ill., in its initial test late in December, 1920. Besides successfully replacing so many men, the machine was able to load so quickly that a great reduction was possible in the number of trucks required. Four trucks only, each being loaded in an average of five minutes, were needed where twelve were required before, when most of their time was spent in waiting during loading.

No change had to be made in the usual scheme followed in removing snow by hand. Plows attached to trucks pushed the snow into long windrows in the gutters. In place of swarming gangs of men shoveling into high trucks, the loader filled the trucks to overflowing very quickly. The machine is mounted on crawlers to gain the best traction. It is powered by a Buda 4-cylinder, truck-type gasoline engine. A 2-armed apron scoops up the snow and turns it onto a wide cleated belt, which carries it up to discharge into waiting motor trucks. This apron plow is adjustable; it is possible to scrape the surface clean or leave enough space to pass over any obstruction. Adjustment is made by the operator from his platform on the loader. Skirt boards 12 inches deep keep the largest lumps on the belt and give it an effective carrying width of 36 inches. The belt is positive drive, being fitted with roller chain on each edge.

Chicago city officials put the loader to work the day after Christmas to remove the snow on Michigan Boulevard. After working the down-

A NEW TYPE OF SNOW-HANDLING MACHINE USED THIS WINTER IN CHICAGO, ILL.

town length of the Boulevard, the machine worked across into the loop district. It ran for 30 hours without a pause, being operated by 3 shifts of 8 hours each. A minor repair was made, and the machine continued. One of the things that recommend it most highly to the officials in charge was the fact that it would work just as hard and tirelessly between midnight and morning as at any other time. This is the time when men are least efficient, if they will work at all.

This is one of the first machines of this type to be put on the market, and it is covered fully by patents. Mr. Barber developed the idea late in the summer of 1920. It had its first tryouts

Better Homes—Better Cities

MORE homes and better homes mean greater civic welfare and progress. Well-built, permanent dwellings of fire-resistive type, contrary to popular belief, are decidedly economical.

While a Hollow Tile house may cost slightly more to erect than frame, costs for depreciation, maintenance, and insurance during the years that follow have proved to be about 66% less.

The large size units in Hollow Tile can be laid very easily and rapidly, saving in labor and material costs. The burned clay is enduring; it does not decay; and it successfully resists fire. Depreciation and upkeep charges are vastly reduced.

The air cells, sealed up in the finished Hollow Tile wall, provide exceptionally effective insulation against dampness, heat and cold. They establish uniform conditions that protect health and afford comfort, regardless of the weather.

The value of these advantages of Hollow Tile construction is undeniable, and the use of this material should be encouraged in every way.

City officials and others interested in building regulation work can secure copies, to use as guides, of a "Standard Building Code" drawn up in accordance with best engineering practices. Address Dept. 242.

MASTER TILE
THE TRADE-MARK OF THE HOLLOW BUILDING TILE ASSOCIATION AND YOUR GUARANTEE OF A PRODUCT MADE IN ACCORDANCE WITH ASSOCIATION STANDARDS

THE HOLLOW BUILDING TILE ASSOCIATION
REPRESENTING AMERICA'S LEADING MANUFACTURERS
CONWAY BUILDING, CHICAGO

in coal and ashes. Chicago expects to use the machine for ash and gravel loading during the summer.

Wallace and Tiernan Move

Owing to the steadily increasing growth and rapidly enlarging scope of the business of Wallace and Tiernan Company, Inc., formerly located at 349 Broadway, New York City, this company on January 15 moved to its new plant, Newark, N. J., where under one roof all the activities of its business will be conducted, including engineering, design, manufacture, assembling, testing and shipping, and all laboratory work, as well as the sales and executive supervision.

Wallace and Tiernan are manufacturers of chlorine control apparatus for the sterilization of water, sewage, tannery and other trade wastes, for the purification of swimming pools, for making bleaching solutions from liquid chlorine, largely used in bleaching paper and in the textile industry, and have developed a machine for deodorizing organic fumes in the waste-stacks of refining plants.

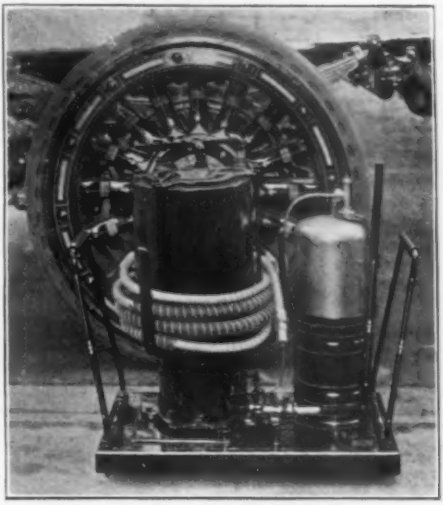
A Portable Device for Thawing Hydrants

After considerable study and experiment, the Ross hydrant thawing device has been developed and is now placed on the market by the American-LaFrance Fire Engine Company, of Elmira, N. Y. This thawing device is simple in construction, compact in design, and effective in operation.

The machine was invented by Louis S. Ross, Newton, Mass., who has long been an expert on steam engineering. The thawing device consists of a steam coil surrounded by a jacket tank, which is filled with water for pumping into the steam coil. By means of a hand-operated pump, water can be forced from the tank into the coils, and by regulating this feed either "wet" or "superheated" steam can be secured at the nozzle. Water is fed continuously into the coil, being converted into steam exactly as is the case when a drop of water falls on a red-hot stove.

The heat is produced from a standard Presto-lite style "B" tank carried with the outfit. Although it is impossible for this boiler to explode in ordinary operation, a safety valve is provided against any unforeseen condition. The steam is led through 15 feet of flexible metallic hose with a braided steel jacket covered for over half its length with asbestos, which in turn is protected by a canvas cover, and the whole wrapping bound with wire. The entire thawing device can be carried easily by two men, for it weighs only 135 pounds completely charged ready for service. It measures only 28 inches across the base, 12 inches wide, and 25 inches high.

The features of portability, the fact that the boiler is not dependent upon an outside source of heat, and the rapidity with which the device produces steam, make this thawing device of general value and unusual practicability wherever a hydrant thawing device can be used, and of particular benefit to fire departments.



A COMPACT, PORTABLE HYDRANT-THAWING MACHINE

Engineering Firm Reorganizes

The business of Miller, Holbrook, Warren & Co., Milliken Building, Decatur, Ill., has been purchased by the new firm of Holbrook, Warren & Andrews. Under the former name the firm has built up a substantial professional business in the structural and municipal field. The three members of the firm have been active in municipal and governmental work for some time. Frank D. Holbrook was engaged for a period of about 15 years on Ohio River improvements for the United States Government. Willis D. P. Warren has been engaged in various classes of engineering work in Illinois for 17 years and has put in the greater part of his time on municipal projects. Captain Clarence R. Andrew was formerly with the Government on Ohio River improvements and served in France in the Engineer Corps.

Novel Pumping Engine for Fire Service

Practically all motor fire pumping apparatus in service to-day uses the same engine to operate the pump and to drive the machine. The city of Pueblo, Colo., has recently purchased the motor pumper illustrated below, consisting of a standard motor truck on which is mounted a 75-horse-power, four-cylinder Duesenberg motor driving a Lea-Courtenay centrifugal pump. At a recent fire test, water was taken under pressure of 20 pounds and for the first six hours was delivered at 120 pounds pressure to three standard 2½-inch lines, at approximately 750 gallons per minute. The machine as built makes provision for four streams, or ap-

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and lasts many years. It is simple in construction and is equally durable and effective on country highways or city streets. Extremes of temperature have no effect on Bitoslag roads. Let us know your needs and we will be glad to consult with you at once to your advantage.

Correspondence Invited

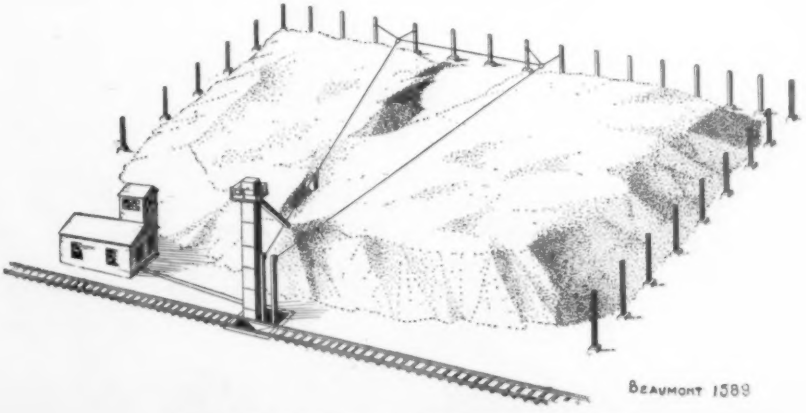
BITOSLAG PAVING Co
90 West Street - New York City

A NEW TYPE OF FIRE PUMPING UNIT WITH SEPARATE ENGINES FOR CHASSIS AND PUMP

proximately 1,000 gallons delivery per minute. The pump, which is a 4-inch, single-stage centrifugal, normally delivers 500 gallons per minute, but readily handles 750 gallons per minute at 100 pounds pressure. This unit was run for 38 hours and 10 minutes, excepting two periods of 40 minutes each caused by moving the unit from one source of water to another, and after this unusual test both the pump and the motor were apparently in as good shape as when first put into service. The Fire Chief stated after the conflagration that Bessemer, a suburb of Pueblo, was saved from destruction by fire through the use of this single unit.

Coal Storage Systems

In the coal storage system involving the use of a cable drag-scraper, manufactured by the R. H. Beaumont Company, Philadelphia, Pa., the coal is received at the plant in railroad cars and discharged into the hopper below the tracks. A chain-and-bucket elevator picks up the coal and delivers it down a chute to form an initial pile 10 feet high adjacent to the railroad track. If the coal is for stoker use, then a crusher is placed in the pit, where it can also be used for crushing frozen slag coal when reclaiming it in winter. A machinery



ISOMETRIC SKETCH OF COAL-HANDLING SCHEME

THE OTTERSON AUTO-EDUCTOR
CLEANS CATCH BASINS
Saves Time—Money—Labor

Mounted on any 5-TON Chassis of suitable standard make.

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Eureka Snow Plow

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Will mount curbs with ease and remove 24 inches of snow in one trip. The wings are adjustable to any width and either wing may be detached. One user writes regarding use with tractors, "The plow is so simple and the method of attaching so easy that these facts coupled with the reasonable price should make a strong appeal to all tractor owners interested in snow removal."

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FIRE HYDRANTS
YARD HYDRANTS
HOSE BOXES

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Builders of Water Service devices since 1853

house contains the driving drums for the cable extending over the storage yard and having a scraper attached to it. The scraper is dragged back and forth over the coal, and is quickly detachable so that it can be turned around to reclaim the coal. Around the yard are steel posts. To store coal at any portion of the storage yard the tail blocks are changed from one post to another.

When reclaiming, the coal is scraped back to the reclaiming hopper and delivered to the bucket elevator, which will discharge the coal either to railroad cars or to conveyors supplying the boiler house. In the first drag-scraper installation, the machinery house and drums were located above the railroad tracks, but on all later systems the house and drums have been located on the ground, to get longer rope leads to the drum.

LAYING CAST IRON WATER-MAIN THROUGH ROUGH COUNTRY FOR NEW WATER-SUPPLY OF ASHEVILLE, N. C.

Over Nine Miles of C. I. Pipe for One Job

In the construction of the new pipe line to double the water-supply of Asheville, N. C., 51,300 feet, or 9.71 miles, of 16-inch cast iron pipe were installed. The total length of pipe, weighing 3,264 tons, was furnished by the U. S. Cast Iron Pipe and Foundry Co., Burlington, N. J.

The laying of the 16-inch pipe meant the surmounting of a great many obstacles, in that the pipe was necessarily hauled in wagons through a very rough and mountainous territory to the point nearest to the pipe line. From there the lengths of pipe were "snaked" to the trench to play their part in furnishing the additional 3,500,000 gallons of water daily to Asheville. The work has been done under the personal supervision of R. J. Sherrill, Commissioner of Public Works, by Kelly & Wilson, contractors, Asheville, N. C. The accompanying illustration gives an idea of the nature of the terrain through which the line runs, and shows a gang preparing to drop a length of pipe into the ditch.

Eibell Leaves Mathieson

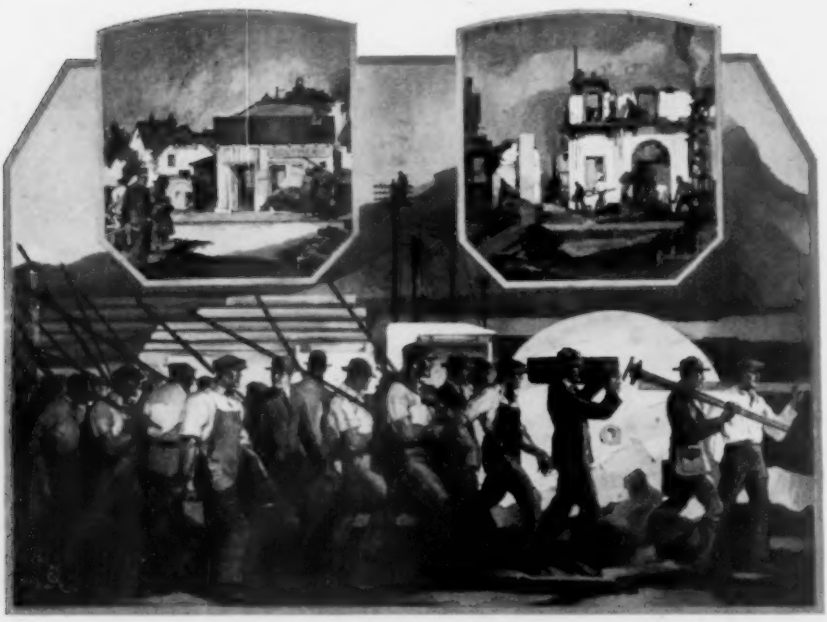
F. B. Eibell, formerly Advertising Manager of the Mathieson Alkali Works, 25 West 43d Street, New York City, has resigned to take up the duties of Secretary and to become a member of the Board of Directors of the Technical Advertising Service, Inc., 214 West 34th Street, New York City.

Pitometer Company Moves

On February 1, 1921, the Pitometer Company moved its offices to the Hudson Terminal Building, 50 Church Street, New York City, where it will continue the practice of hydraulic engineering and specializing in water waste surveys for the conservation of municipal water supplies. The district offices at Detroit and Kansas City will remain as formerly.

Blanchard Retained by Colorado Springs

Announcement has just been made that Professor Arthur H. Blanchard, consulting highway and transport engineer, Ann Arbor, Mich., has been retained by the city of Colorado Springs in connection with its $1,200,000 paving program. Professor Blanchard, has been active in founding the Highway Engineering Scholarships at the University of Michigan.



Winning the Battles of Peace

France has almost won her great fight against war's destruction. Eighty per cent of her wrecked and crippled factories again hum with activity. All of the 4,006 villages and towns in the devastated regions have again resumed municipal life; and of the 6,445 schools in this vast area, 5,345 have been rebuilt and opened. Farms, factories and homes again cover most of the scarred land.

In her reconstruction, France has shown the same unconquerable spirit that stopped her invaders at the Marne.

And here, at home, another great peaceful victory is being won against the greatest odds. This has been the fight of the Bell telephone employees to rebuild a national service.

Despite all of the difficulties of the post-war period, the organized forces of the Bell system have established new records in maintenance and construction.

Facing, after the armistice, a public demand such as was never before known; they have yet responded to the nation's needs with hundreds of new buildings, thousands of miles of new wires and cables, and with the installatior in the last year, alone, of over half a million new telephones.

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